MAY 17, 1957

THE Lumberman

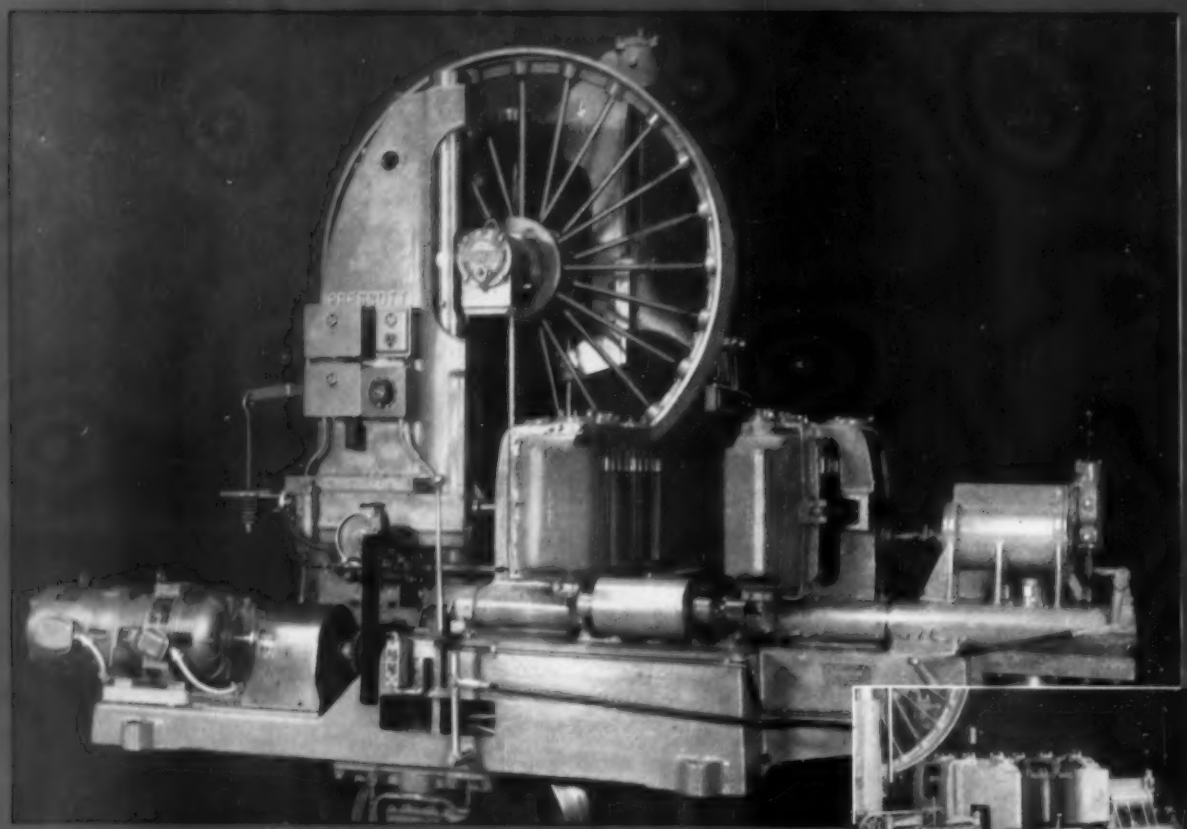
LUMBER PLYWOOD BOARD WOOD MANUFACTURING

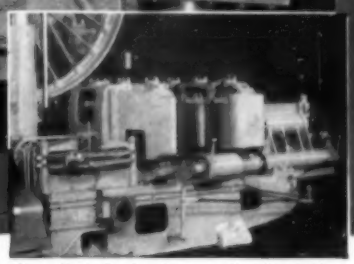
ANNUAL BOARD REVIEW

INSULATING BOARD | PARTICLEBOARD

FLAKEBOARD | HARDBOARD

1957 EDITION





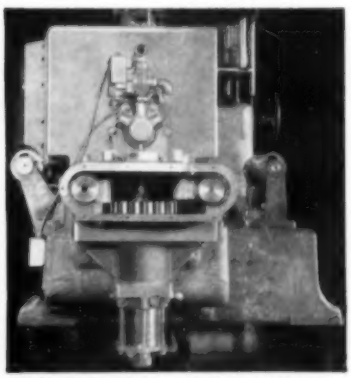
PRESCOTT *vertical resaws...for the profitable production of more saleable lumber per log*

Increase your mill's output and reduce your operating expenses by installing a Prescott Vertical Resaw to get *all* the lumber out of *every* log. Precise mechanical accuracy gives you much better grade recovery — better sawing in all grades — and a high volume of smooth, straight, saleable lumber. Prescott Vertical Resaws minimize waste — practically eliminate downtime — deliver efficient, day-after-day performance for years — and return a greater net profit to you.

Here's how they do it — some of the major features of Prescott Vertical Resaws, combining the latest advances in resaw engineering and basic service-proved Prescott designs:

- Practical, Heavy-Duty Sizes — 5-6-7 Foot
- One-Piece Vibrationless Base
- Perfectly Balanced Wheels and Shafts
- Self-Aligning Roller Bearings
- Simplified, Ultra Sensitive Knife-Edge Straining Device
- Compact, Heavy-Duty Feedworks System
- Continuously Variable Feedworks Drive
- Pre-Set or Lever Air Setworks
- Side Sawing and Self-Centering — Instantly Changeable
- Completely Self-Contained

Heavy-Duty Feedworks — safe, vibrationless, extremely compact and precisely accurate. Eliminates wane and scant sawing.



Double Rack and Pinion Combination Setworks — spring-proof and instantly changeable from side sawing to self-centering.

New . . . Illustrated Literature containing complete technical data and detailed specifications is now available. Call, wire or write for this comprehensive material on Prescott Vertical Resaws or the services of one of Prescott's experienced sawmill engineers.

For Profitable Sawmill Operation... **SPECIFY**

PRESCOTT

HIGH EFFICIENCY, HEAVY-DUTY SAWMILL MACHINERY

THE PRESCOTT COMPANY, *Menominee, Mich.*

The going's good here, but in muddy going, too, this Cat No. 977 Traxcavator keeps producing for G. N. Dodge Lumber Co. Besides this unit hauling logs in the yard, the company uses two Cat D7 Tractors logging in the woods.

Hauling logs from deck to pond at a sawmill with 50,000 board feet daily capacity

This No. 977 Traxcavator* replaced 3 machines

Eighteen miles north of Nevada City, California, the G. N. Dodge Lumber Co. has a profitable operation. Last year, in an experiment to lower costs around the sawmill, the company purchased this CAT* No. 977 Traxcavator for hauling logs from deck to pond. Here's the result, straight from owner G. N. Dodge:

"When we got the No. 977, we doubted it could haul enough logs to keep our mill running—50,000 bd. ft. a day. But we found that it can handle up to 70,000 bd. ft. an 8-hour day. That's on a haul of about 750 ft.—and without a counterweight on the back of the machine.

"In previous years this job required a crane, a tractor and a logging truck. They could only do a little more than keep the mill going. What's more, in wet weather we had difficulty hauling with the truck. Our No. 977 works in all kinds of weather. Its broad tracks don't tear up the yard. We like its electric starting. And we have a bucket as well as a fork for it to handle other chores.

"We've been using Caterpillar-built machines for eleven years and feel they deliver maximum production. We've also found that we get excellent availability of parts and service from our Caterpillar Dealer."

Are you looking for ways to lower costs—either around your mill or in the woods? Make a point of seeing what a versatile Caterpillar-built Traxcavator can do for you. Besides the 100 HP No. 977, there are the 70 HP No. 955 and the 50 HP No. 933. Pound for pound, in comparison with other units, these rugged rigs deliver more lift, faster lift and more production. And they're available with quick-change attachments that multiply their usefulness for hauling, loading, 'dozing, excavating, etc. Get the complete facts from your Caterpillar Dealer.

Caterpillar Tractor Co., San Francisco, Cal.; Peoria, Ill., U.S.A.

CATERPILLAR*

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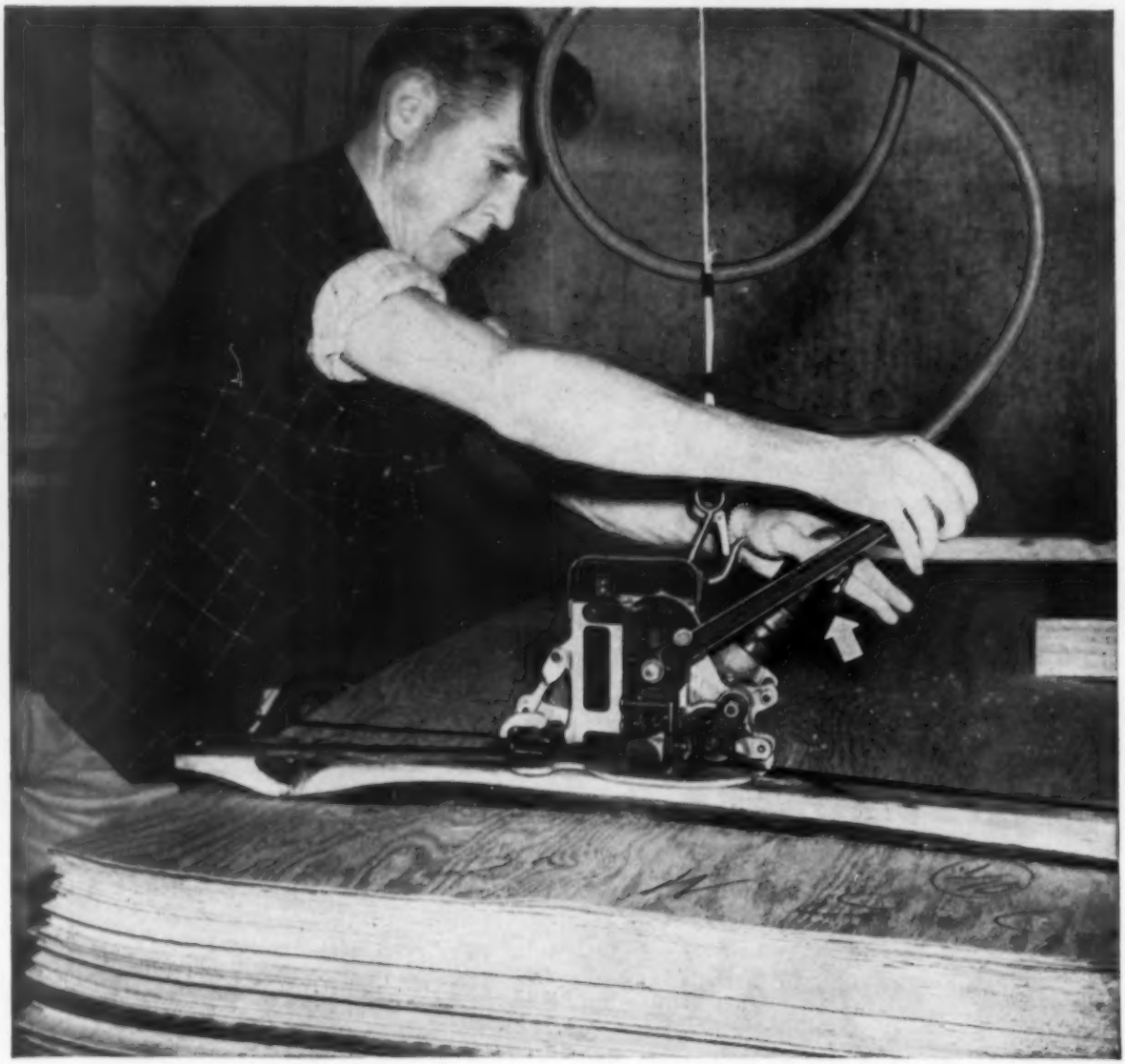
WANTED—
THE HARD WORK



Fast, new way to strap plywood and veneer

Tightening steel strapping by hand can be hard work on big compressible bundles like veneer. But this fellow is doing it the fast, easy way. He's using Signode's new air-powered strapping machine. It has plenty of power for fast take-up. You pre-set the tension and you get it automatically every time—up to 1600 pounds. A light squeeze on the air valve (arrow), a quick stroke of the handle, and another strap is tensioned, sealed, and cut off from the coil. No strap wasted; no time wasted; less operator fatigue; no tensioning errors. Uses ⅝" or ¾" Signode steel strapping; automatic seal-feed magazine holds 75 seals. There is nothing else like it! Your Signode representative can show you. No obligation. Just write:

SIGNODE STEEL STRAPPING CO.

2616 N. Western Avenue, Chicago 47, Ill.

San Francisco, 383 Brannan St. • Eugene, 1955 Todd • Portland, 1519 N.W. Irving St. Seattle, 2 Hanford St. • Spokane, 417 Paulsen Bldg. • Olympia, 1024 Eskridge Blvd. Canadian Steel Strapping Co., Ltd., Vancouver, B.C.

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May 17, 1957

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Publisher and General Manager

THE Lumberman

LUMBER PLYWOOD BOARD WOOD MANUFACTURING

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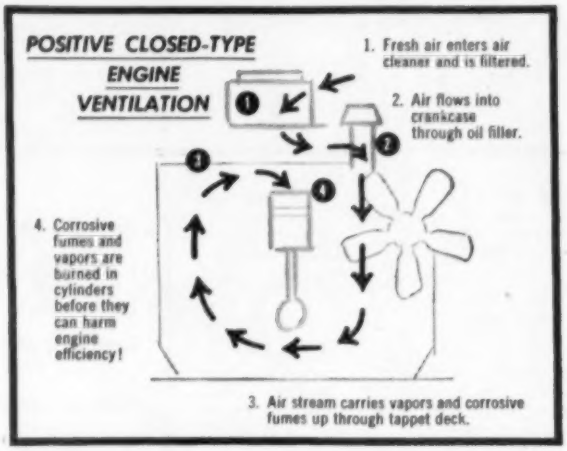
"CLEAN LIVING" GIVES A CHEVY ENGINE LONGER LIFE!

...more evidence that Chevrolet Task-Force trucks are engineered better and built better for bigger savings!


POSITIVE CLOSED-TYPE ENGINE VENTILATION
1. Fresh air enters air cleaner and is filtered.
2. Air flows into crankcase through oil filler.
3. Air stream carries vapors and corrosive fumes up through tappet deck.
4. Corrosive fumes and vapors are burned in cylinders before they can harm engine efficiency!

This drawing shows, roughly, one of the ways in which Chevrolet truck engines minimize a major cause of wear—dirt! Now consider this additional evidence that Chevy heavy-duty V8's and 6's "live clean" and bring you fleet, dependable power that costs less to use!

Extra filters give extra-clean fuel—Only *clean* fuel reaches the engine—that's one reason you can depend on a Chevrolet truck! All fuel is filtered twice (once in the fuel tank and again in the carburetor) to keep dirt and water from hampering efficient operation. Chevrolet truck V8's *provide* a *third* filter, at the carburetor, for triple protection!

Oil stays clean longer, too—Chevrolet truck V8's and 261-cu.-in. 6's come equipped with modern high-capacity oil filters (V8 filters are of the Full-Flow type). These engines keep *clean* oil flowing to moving parts; parts wear less and last longer because of it!

Even the air is cleaner—Dust and foreign matter in the air an engine "breathes" can reduce engine life by years. Chevrolet minimizes this wear-producing factor by providing big oil-bath air cleaners as *standard equipment* on all truck engines.

These are sound under-the-hood reasons why a Chevrolet truck will *stay* on your job and *save* on your job. There are others, too, including short-stroke V8 design (shortest stroke of any truck V8's!) and 6-cylinder engine design that puts out more power than any other in the field. You'll learn about them all when you visit your Chevrolet dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Biggest sellers . . . because they're biggest savers!

CHEVROLET TASK·FORCE 57 TRUCKS

OUR SPECIAL ISSUE

ANNUAL BOARD REVIEW

INSULATING BOARD | PARTICLEBOARD

FLAKEBOARD | HARDBOARD

1957 EDITION

In this issue THE LUMBERMAN initiates its Annual Board Review, including hardboard, insulating board, particle board and flakeboard. These are the newest segments of the forest products industry which are thriving on milling residues, including both chips and planer shavings. The potential in these fields hasn't been fully realized and you will agree, after reviewing the editorial contents of this special issue, that the future in these fields looks promising, even though many problems still exist.

Industry Meetings

May

Mason County Forest Festival, Shelton, Wash., pageant, parade and logging sports demonstration, May 23-25.

Redwood Region Logging Conference, 19th annual, Eureka, Calif., May 24-25.

June

American Society of Mechanical Engineers semi-annual meeting, San Francisco, Calif., June 9-13.

National-American Wholesale Lumber Assoc., 65th annual meeting, Mt. Washington Hotel, Bretton Woods, N. H., June 10-11.

Douglas Fir Plywood Association, annual meeting, Gearhart Hotel, Gearhart, Ore., June 9-11.

National Plywood Distributors Assn., annual convention, Edgewater Beach Hotel, Chicago, June 13-15.

Forest Products Research Society, annual national meeting, Exhibit, and Wood Industry and Suppliers, Hotel Statler, Buffalo, N. Y., June 23-28.

National Wooden Box Association annual summer meeting, Lake Placid Club, Essex County, N. Y., June 24-26.

July

Northwest Hardwood Association, quarterly meeting, Leopold Hotel, Bellingham, Wash., July 20.

Pacific Division, National Wooden Box Association, Fresno Hacienda Motel, Clinton, Calif., July 17-18.

August

Society of Automotive Engineers, Seattle, Aug. 12-16. (Members of forest industries will be participating.)

September

Association of State Foresters, Longview, Wash., Sept. 11-13.

Western Pine Association, semi-annual meeting, Multnomah Hotel, Portland, Ore., Sept. 11-13.

Hoo-Hoo, 66th annual national convention, Dinkler-Plaza Hotel, Atlanta, Ga., Sept. 15-18.

Northern Sash and Door Jobbers Association, Minneapolis, Minn., Sept. 30-Oct. 2.

October

Pacific Logging Congress & Machinery Show, Seattle, Oct. 30-Nov. 1.

December

Western Forestry & Conservation Association, Olympic Hotel, Seattle, Wash., Dec. 10-13.

THE Lumberman

LUMBER PLYWOOD BOARD WOOD MANUFACTURING

Presents as **Tall Timber**

BRIAN B. GATTIE

BRIAN B. GATTIE, general manager, Western Forest Industries, Ltd., Vancouver, B. C.

BRIAN B. GATTIE, general manager of Western Forest Industries, Limited, Vancouver, B. C., still modestly claims to be "only an immigrant" and a relative newcomer to the Pacific coast lumber business. But don't let that fool you; he has crowded into a few busy years more experience of the trade than many others have managed to do in half a century.

Today Mr. Gattie is recognized as one of the most accomplished leaders in Western Canada's lumber industry. This is reflected in his choice as current president of the B. C. Lumber Manufacturers Association and as president of the British Columbia branch of the Canadian Forestry Association.

As the top executive in one of the province's most aggressive logging and lumber operations, Mr. Gattie has been close to the production phases of the business ever since he located permanently in Canada. But he will always be well remembered in lumber circles in the U. S. as well as Canada for the successful part he played during the war years in mobilizing supplies of lumber for the United Kingdom and France. A close student of trends, Mr. Gattie has recently been much in demand as a speaker before gatherings of lumbermen and loggers.

ALTHOUGH NOW THOROUGHLY transplanted as a permanent resident of Vancouver, Mr. Gattie recalls that his first experience in Canada was anything but promising. That was back in 1909 when as a youth, he left his native London, to work as a farm hand near Regina, Saskatchewan. After a year and half he was disillusioned and returned to England and at that time the thought of ever making his home in Canada was probably non-existent.

Mr. Gattie, who had been educated at Alleyns School, Dulwich, entered a profession more suited to his fancy and family background when he joined the staff of Coutts Bank, a private financial institution which for many years had served British and French aristocracy. But World War I interrupted his banking career, even though he never regretted the training that this brief turn of duty gave him. He served with the 28th Division, British Expeditionary Force. It was there that he met the two men who were to re-cast his destiny — Prier Bamberger and Archie Harris, partners of the century-old British lumber importing firm of Louis Bamberger & Sons, which he joined after the war, eventually becoming a partner.

The lumberman from London made his first business trip to Canada in 1933 and every year thereafter spent two months in Canada purchasing lumber, one month in British Columbia and the other in Eastern Canada. It was due to his knowledge of Canadian lumber gained during those years that fitted him for service with the "shadow" timber control organized in the United Kingdom before World War II. His familiarity with airplane grades resulted in the British Air Ministry arranging for his being sent to Canada by the Timber Control Board to help stimulate production of spruce. During the first three years of the war he was a direct buying representative of the British and the French governments in Canada and the U. S.

EVENTUALLY, AS THE DEMAND for replacements of aircraft grew, Aero Timber Products, a crown company, was organized to expedite production on the Queen Charlotte Islands and elsewhere. This was directed by R. J. Filberg and the late J. H. McDonald and Percy Sills. Mr. Gattie maintained close liason with them as representative of the Timber Control Board in Britain, headed during the war years by Sir Archibald Harris and later by Sir Edward Monkhouse.

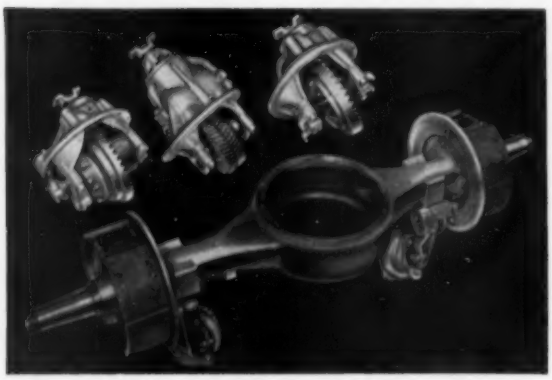
During 1939-45 Mr. Gattie made his home in Vancouver, although he made frequent trips overseas. When the war was over he rejoined the Bamberger organization, but only for a few months. The frustration within the British industry at that time prepared him for ready acceptance of the job offered him on his next transatlantic trip by Walter and Leon Koerner, who were then organizing Western Forest Industries with the late Sir Walter Carpenter, the Australian cop-

(*Continued on page* 132)

EATON AXLES

Outstanding Performance Cuts Hauling Costs, Assures Longer Vehicle Life

Strict adherence to exacting quality standards, the most modern of production procedures, and important design advancements developed through Eaton's years of axle experience, combine to offer the truck operator axles with many worthwhile benefits. Eaton Axles, engineered for rugged stamina, keep trucks on the job, hold down operating and maintenance costs, and deliver more vehicle miles at lower cost per mile.



This rugged housing, used in famous Eaton 2-Speeds, is also used for Eaton single-reduction and double-reduction axles. The three types of heads are interchangeable.

EATON — *AXLE DIVISION*
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves. Tappets. Hydraulic Valve Lifters. Valve Seat Inserts. Jet Engine Parts. Rotor Pumps. Motor Truck Axles. Permanent Mold Gray Iron Castings. Heater-Defroster Units. Snap Rings Springlites. Spring Washers. Cold Drawn Steel. Stampings. Leaf and Coil Springs. Dynamatic Drives, Brakes, Dynamometers

The LUMBERMAN'S LOOKOUT

LOOK FOR INCREASED USE of electronic computation systems in inventory controls. Many time-consuming chores involving endless figuring are being taken over by "fantastic" machines fed with punch cards or tape systems. Integrated data processing, as it's called, is fast becoming a useful tool in operations where many units must be keyed into a central operation. Microwave transmission of data between stations is next big step. Southern Pacific Railroad recently installed elaborate punch-card system for keeping tab on empty box cars on its lines.

IT'S CALLED "PIGGYBACK for grownups" by some, but rail shipments via trailers moving on flat cars is growing trend, may offer possibilities in shipping some forest products. System involves putting loaded highway transport trailers on rails for intercity hauls, delivering product to job site at other end via trailer. Combined with packaging of wood products, merchandising prospects offer possibilities. Forty railroads nationwide now are moving about 4000 cars of such trailer traffic weekly.

EXPECT SOME FORM of indirect wage increase in western forest products industry when wage negotiations now in progress are completed. It may be in form of fringe benefits, rather than hourly wage. Probably no industry wide strike. Reason: all other elements in U. S. economy are basically healthy, have established pattern of wage boosts. Even though lumber and plywood industry is not doing too well, it costs money to shut down big plants and lose key workers. Smaller plants will have to face shutdown if low ebb in housing starts continues.

ANTICIPATE INCREASE in younger, untrained workers in labor force in next 10 years. It's expected that 14 to 24 age group will increase by one third, or 2.7 million. Workers over 45 years of age will increase by about 2.3 million, or 13 per cent. The 25 to 44 age group will remain about same. This means increased need for skilled machines, or automation, to offset increase in unskilled workers.

EXPECT THE USE of glued laminated wood and trussed rafter systems for residential construction to continue their phenomenal rise. They give architect new freedom of design. Some laminated members are multi-purpose parts, providing ordinarily separate elements of floor, wall and roof support in single package. Other beams of extreme length permit construction of interior areas with dimensions once unheard of. Same roof members offer unlimited possibilities in school construction, which offers yet untapped markets for lumber.

TREATED WOOD AND LUMBER products will find increasing use in residential construction in termite infested areas. It's cheaper to pressure treat all lumber in house than to install substitute metal parts in critical areas, such as window and door frames. More promotion is needed to sell advantages of such treatment, plus use of treated rigid pole method of building construction.

ANOTHER CATERPILLAR FIRST!

CERTIFIED POWER

FOR CAT* DIESEL ENGINES

CATERPILLAR TRACTOR CO.

ENGINE POWER CERTIFICATION

This is to certify that the Diesel Engine herein described has been engineered, manufactured and tested in accordance with rigid Caterpillar Standards. The materials and workmanship incorporated into this engine give it the inherent capacity for satisfactory performance when applied in accordance with the power ratings established and recommended by this company. The MAXIMUM OUTPUT capacity of this standard production engine is 200 H.P. @ 2000 R.P.M. equipped with: air cleaner, water pump, lubricating oil pump, fuel pump, and standard intake and exhaust manifolds.

I certify that R. L. Henson, Supervisor of Diesel Engine Test, Caterpillar Tractor Co., ... Certification and I affix my ... 57.

R. L. Henson
Supervisor Diesel Engine Test
Caterpillar Tractor Co.
Peoria, Illinois

... /58

Caterpillar Model D326 Industrial ... was manufactured and shipped as follows: Engine Serial No. 3981018 Shipping Date February 11, 1957

Power Setting 152 H.P. @ 1600 R.P.M. Intermittent Power Rating

Radiator & Fan
Ether Starting Aid
32V Charging Generator
Governor Control
Tachometer Drive
Muffler
Heater Connections
Remote Shut-off

POWER RATINGS

MAXIMUM OUTPUT is the horsepower capacity of the engine, a measure of the maximum power, in HP, that can be developed for five minutes without drop in speed.

INTERMITTENT HORSEPOWER is a rating for use on variable load applications such as excavators, hoists, and standby power units, where the duration of sustained full power output is one hour or less, with the average output not over 80% of Intermittent Horsepower.

RATED HORSEPOWER is a rating for use on applications such as planing mills, hammer mills, and rock crushers where the duration of sustained full power output is 12 hours or less.

CONTINUOUS HORSEPOWER is a rating for use in applications such as work boats and pumps, where the duration of sustained full power output is 24 hours per day, day in—day out.

Horsepower figures are established in accordance with rigid Caterpillar standards. All ratings, corrected to sea level barometric pressure (29.92 in. Hg.) and standard temperature (60°F), apply to a production engine including air cleaner, water pump, lubricating oil pump, fuel pump and standard intake and exhaust manifolds. The above ratings are based on Bemish and American BHP.

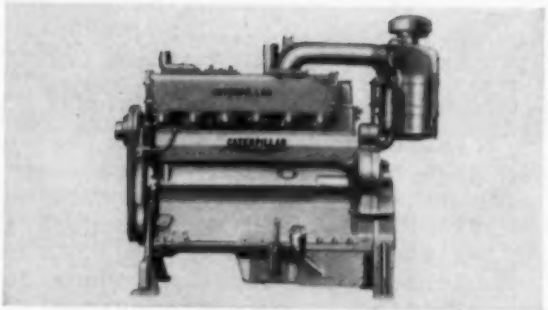
FORM NO. 915-57555 Printed in U.S.A.

In a quarter century of diesel leadership Caterpillar Engines have achieved a reputation for *honestly rated power*. Owners have found that they can depend on a Cat Diesel to deliver the power promised.

Now, to back this reputation, Caterpillar becomes the *first* manufacturer to issue a certificate showing the horsepower capabilities of the engine. This certificate is signed by Caterpillar Tractor Co. and certified by a notary public.

You have a right to demand *certified power* when you invest in an engine. You get it when you buy from your Caterpillar Dealer. Let him show you the certified power plant that fits your needs.

Caterpillar Tractor Co., San Francisco, Calif.; Peoria, Ill., U.S.A.



CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

INDUSTRY TRENDS

RAIL SHIPMENTS of lumber and logs from the Pacific Northwest are running behind a year ago and the slow tempo is expected to continue in the second quarter. Pick-ups are expected, however, in plywood, paper and paper products and pulp.

Shipments of plywood in the second quarter are expected to be up 10%, paper and paper products 7.3% and pulp 4.5%. Pine lumber shipments are expected to fall off 7.5%, maybe as much as 10%. Douglas fir lumber activity will be off 2.4%, logs 4%.

* * *

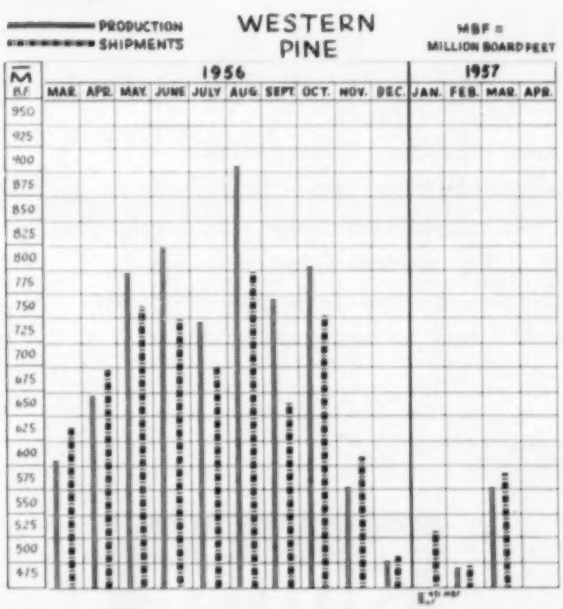
PLYWOOD PRICES were increased $1 to $3 per thousand by western manufacturers early in May as the result of increasing order files and growing unfilled order files that now total well over 360 million square feet. Prices were upped by some major producers by $1 to $2 on 5/16-inch sheathing, and $3 on ⅜-inch sheathing.

* * *

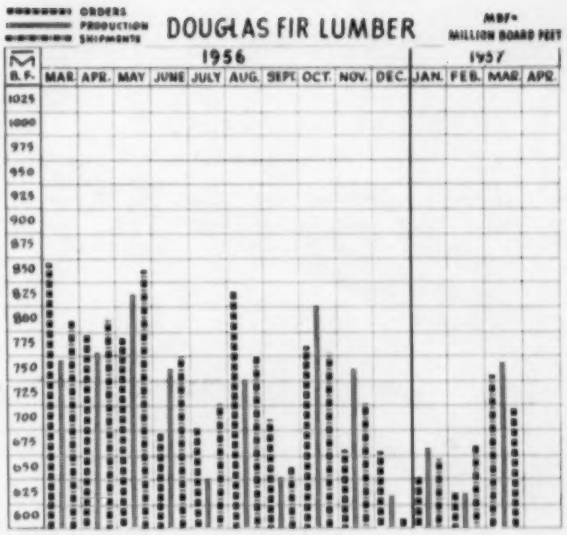
WESTERN PINE REGION activity at the end of the first quarter continues to lag behind 1956 with production off 9%, shipments off 10%. Production in the quarter totaled 1.5 billion feet, compared to 1.65 billion feet a year ago. Shipments totaled 1.6 billion feet, compared to 1.78 billion a year ago.

* * *

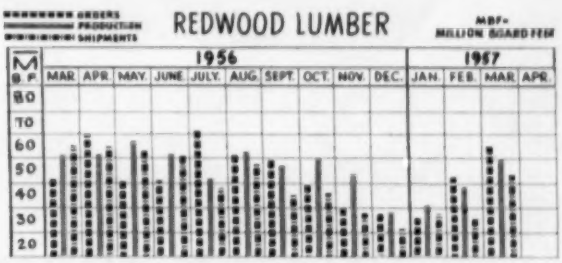
B. C. LOG PRODUCTION in 1956 was at a record high of 6.3 billion feet, about 22 million feet higher than in 1955. However, log production in 1957 is running consistently below a year ago. Some improvement was noted early in April. With the decline in export sales, inventories on March 15 were at 700 million feet, compared with 565 million feet a year ago.



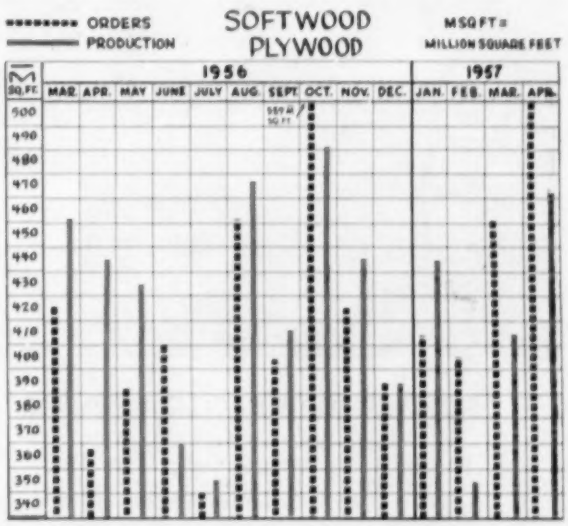
WESTERN PINE region production in March totaled 558 million feet, down from 610 million feet in March, 1956. Shipments were 572 million feet, compared with 639 million feet a year ago. Gross stocks on March 31 were 2 billion feet, up 19% over the 1.67 billion feet on the same date of 1956 and the three-year average, 1954-1956.



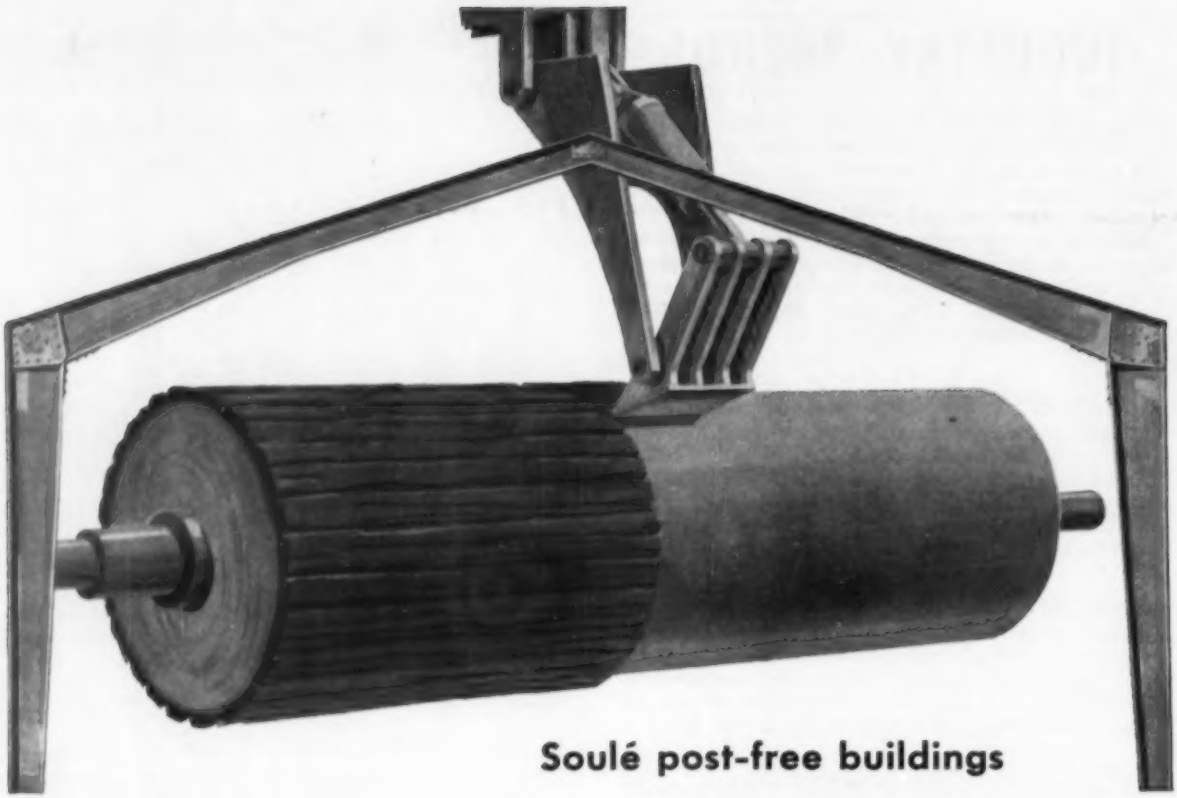
DOUGLAS FIR region production for three months of 1957 is 2.14 billion feet; three months, 1956, was 2.31 billion feet; three months, 1955, 2.56 billion feet. Orders for the three months totaled 2.04 billion feet; shipments 2.01 billion feet. Unfilled orders on March 31 totaled 635 million feet; gross stocks, 1.2 billion feet.



REDWOOD production in the first quarter totals 136 million feet, compared to 158.7 million feet in the same period of 1956, according to reports from 15 major producers. Other comparisons for the quarter: shipments 113.9 million feet in 1957, 131.5 million feet in 1956; orders on hand, 54,154,000 feet in 1957, 100,357,000 feet in 1956; stocks, 412 million feet in 1957, 372.8 million feet in 1956.



DOUGLAS FIR PLYWOOD production in the first 17 weeks of 1957 totals 1.68 billion square feet, down 5.1% from the same period of 1956. New orders in the period totaled 1.72 billion square feet.



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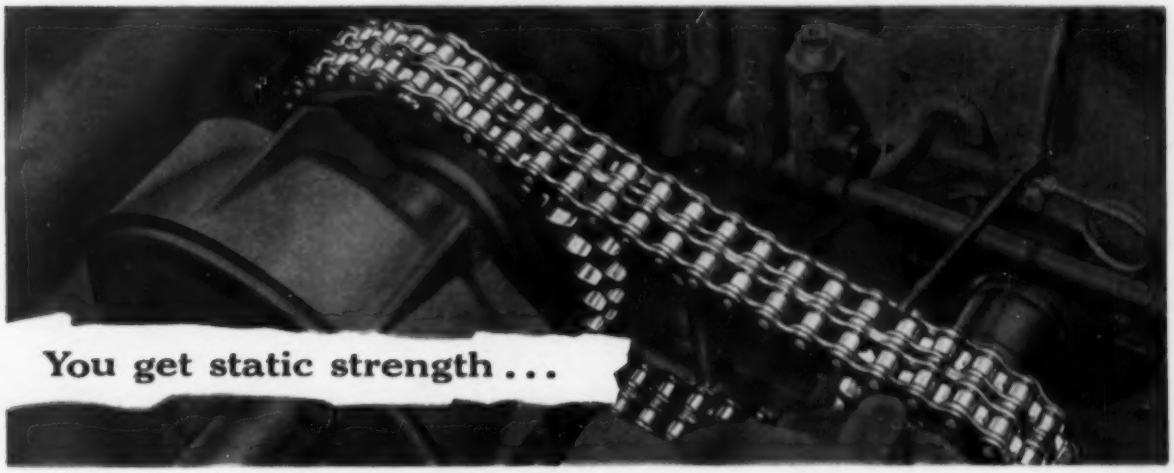
Why tough-service drive and conveyor jobs demand LINK-BELT roller chain



RESISTANCE TO TENSILE STRESS is achieved with properly heat-treated, accurately machined side bars made of premium steel and fitted with properly hardened pins, bushings, rollers.

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For full data on Link-Belt roller chain, see your Link-Belt office or authorized stock-carrying distributor.

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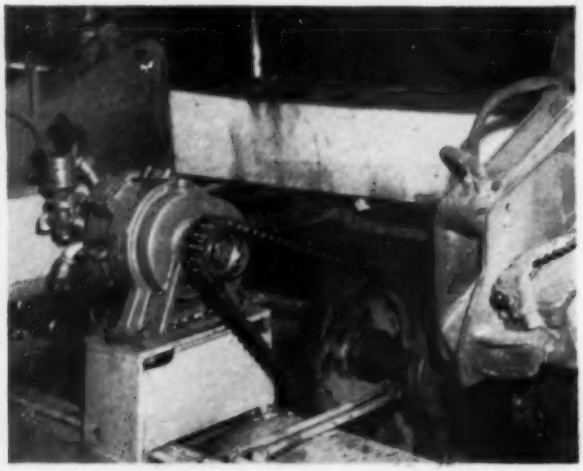
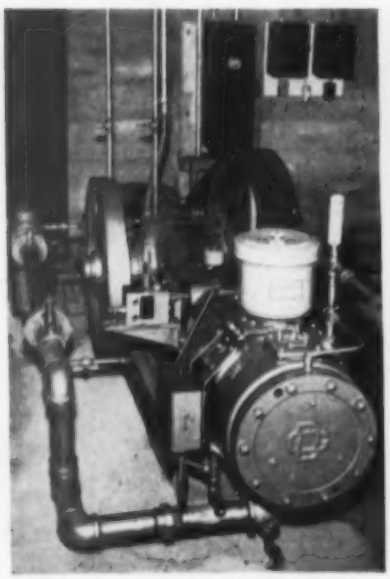
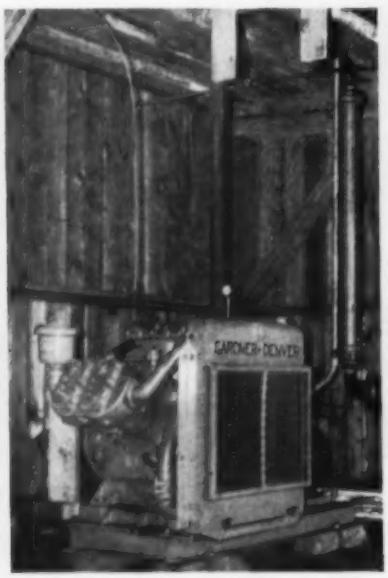
Gardner-Denver Air Motors—can't heat up, can't burn out. Geared and direct drive, reversible and non-reversible models available. Here one works on de-barker.



Gardner-Denver Air Motors—adaptable to a wide range of jobs. Here one provides air power for set works. Five cylinder radial design. Models from 3 to 15 h.p.



Gardner-Denver RX Compressors—for continuous service at low power cost. Sizes: 89 to 1292 cfm.



Gardner-Denver WB Compressors—compact, smooth running. Eight sizes from 142 to 1150 cfm.

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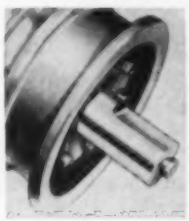

"500" means up to 500 work hours between lubrications from new CAT* rollers. Add up the savings in service time and labor costs this feature gives you! Available for Caterpillar D7, D8 and D9 Tractors, the Cat "500" Roller also features large load carrying bearings, deep hardened *forged steel* rims, selectively hardened shafts and special long-lasting seals. Other makes of rollers may look like originals, but can you trust them? Be sure to get parts you *know*—from your Caterpillar Dealer.

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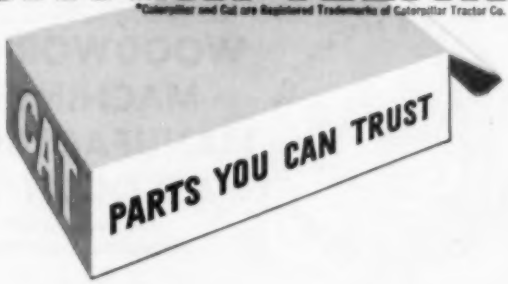

significant industry news

BOISE PAYETTE, CASCADE LUMBER MERGING . . . Directors of Cascade Lumber Co., Yakima, Wash., and Boise Payette Lumber Co., Boise, Ida., have approved merger of the two firms. Final approval of the move awaits a vote of Boise Payette stockholders May 27. A stock exchange would accomplish the merger; Boise Payette would be the parent company and Cascade would operate as a subsidiary. Name of the new organization would be Boise Cascade Corporation. Boise Payette has substantial timber holdings in southwestern Idaho, operates mills at Emmett, Council and Cascade and 78 lumber yards in Idaho, Oregon, Utah, Colorado and Wyoming, and a wholesale subsidiary, Morrison-Merrill, with facilities at Salt Lake City, Utah, Reno, Nev., Idaho Falls, Twin Falls, Boise and Pocatello, Ida. Cascade Lumber has timber in central Washington, sawmills at Yakima, Goldendale, Naches and Ellensburg, and eight retail lumber yards in central Washington. Particle board and pulp plants are considered a logical future development.

SIMPSON NAMES MANARY TO CALIFORNIA POST . . . Gordon Manary, vice-president and general manager of The Pacific Lumber Co., Scotia, Calif., since 1952, is the new vice-president and general manager of Simpson Redwood Co. at Eureka, Calif. He succeeds W. E. Lawson who has resigned. Manary has long experience in the redwood area, joining Pacific as logging superintendent in 1929. He became logging manager, then general manager of the company's Humboldt properties in 1948. He earlier worked in Oregon.

FOREST SERVICE FILLS RESEARCH POST . . . George M. Jemison, director of the U. S. Forest Service's California Forest and Range Experiment Station since 1954, has been named deputy assistant chief for research of the forest service. He will plan, direct and coordinate all forest service research, will integrate research among the nine regional experiment stations and the laboratory at Madison, Wis.

NLMA NAMES EXECUTIVE VICE-PRESIDENT . . . Mortimer B. Doyle is the new executive vice-president of the National Lumber Manufacturers Association. He most recently was manager of NLMA's midwest operations, and succeeds Leo V. Bodine who recently resigned to become vice-president of Diamond Match co., in charge of Pacific Northwest operation. Doyle has served with the NLMA for 10 years.

EASTERN BOX PLANTS MERGING . . . New England Box Co., Greenfield, Mass., and Chaffee Brothers Co., Oxford, Mass., will be merged by the end of May, and will operate under the new name of New England-Chaffee, Inc. Officers will include Leslie J. Chaffee, president; Scott Keith, treasurer; and Norman Chaffee and E. T. Dickinson, vice-presidents. The new company will operate six plants, located at Wilton, Concord, Keene and Winchester, N.H., and Wilmington, Vt., and Oxford, Mass.

ARIZONA SALE PROMISES PULP MILL . . . Navajo Pulp & Paper Co., a newly-formed organization located at Winslow, Ariz., submitted the lone bid for a U. S. Forest Service 200,000-cord pulpwood sale on the Sitgreaves National Forest. Bid price was $1.20 a cord. Principals of the firm are George Brown, W. W. Armstrong and B. H. Mead. Plans call for constructing a mill at Winslow to use at least 20,000 cords annually. Groundwood type pulp will be produced initially.

WOODS MANAGER NAMED FOR SITKA OPERATION . . . Archie M. Byers has been named wood manager by the Alaska Lumber & Pulp Co., Inc., for the pulp mill it plans to build at Sitka, Alaska. He will be in charge of procuring wood for the plant. He was woods superintendent for Alaska Pine & Pulp.

SIMPSON LOGGING CO., Shelton, Wash., says it is contemplating a $7.5 million expansion of its plant at Shelton to handle anticipated nationwide increased demand for its insulating products. The announcement followed closely public showings of its wood fibre fissured acoustical tile.

GEORGE H. MAHONEY has been named vice-president and general manager of the Pacific Coast Lumber and Imported Plywood and Hardwood operations of W. R. Grace & Co. He has been with Grace for more than 30 years, has served as export department manager, and currently is vice-president in charge of the Pacific Coast general import-export operations.

DIAMOND LUMBER CO., Tillamook, Ore., has purchased the Trask Lumber Co., also Tillamook, which includes a sawmill with a capacity of 90,000 feet a day and a remanufacturing plant. The latter will be operated until present rough stock is completed. Addition of the facilities provides Diamond with a plywood mill, two sawmills and a remanufacturing plant in Tillamook.

CARROLL E. BROWN has been promoted to forest supervisor of the Rogue River National Forest in Oregon with headquarters at Medford. He succeeds Jack Wood who is being transferred to a staff position in Washington, D.C. For the past year and a half Brown has been a staff officer in the regional division of recreation and land in the Portland office.

HENRY BAHR, veteran member of the National Lumber Manufacturers Association in Washington, D.C., has been named vice-president and general counsel of the association. He will continue to serve as association secretary and director of its law information service. He has been with the organization since 1936.

MASONITE CORPORATION OF AUSTRALIA, LTD., is building a hardboard plant at Eildon, Australia, and may have it in operation in mid-summer.

ROBERT N. KELLY has been named assistant to the executive vice-president of Coquille Plywood, a division of Textron, Inc., at Coquille, Ore. His duties will also include coordinating and planning production and sales. Kelly started in the plywood industry with the Douglas Fir Plywood Association, has since served with M and M Wood Working Co. and as vice-president and sales manager of Sierra Plywood Distributors and Douglas Fir Plywood Distributors in San Francisco, Calif.

LARSON LUMBER CO. has started production at its new mill midway between Corvallis and Philomath, Ore. It is a band unit. The installation includes a barker and chipper. The plant will have a capacity of 100,00 feet a shift. Owners include Gorden T. Larson, president; Clifford Melby, vice-president; and Kermit Roth, treasurer.

ROGER R. ROBINSON, area fire control officer for the Bureau of Land Management at Anchorage, Alaska, is a winner of the Nash Conservation Award made by the American Association for the Advancement of Science. The award went to Robinson for his "untiring efforts in the field of forest resource protection."

WEYERHAEUSER TIMBER CO. has completed the merger of Kieckhefer Container Co. and The Eddy Paper Corporation into its organization. Kieckhefer-Eddy facilities, which include shipping container and milk carton plants throughout the United States, will be operated as the Keickhefer-Eddy Division of Weyerhaeuser Timber Co.

VICTOR N. STOKES, formerly assistant forest supervisor on the Fishlake National Forest in Utah, has been transferred to Missoula, Mont., where he will be given an assignment in the range management division.

M. A. WHITMAN, Seattle, Wash., has been re-elected president of the Pacific Lumber Inspection Bureau Inc. H. W. Murphy, Seattle, was re-elected secretary-manager. Other officers include L. R. Andrews, Vancouver, B.C., secretary for the B.C. division; C. J. Fairhurst, San Rafael, Calif., and L. L. G. Bentley, Vancouver, B.C., first vice-presidents for the U.S. and B.C. divisions.

PHILIP H. CHADBOURNE, Chadbourne Lumber Co., Bethel, Me., succeeds George P. Kingsley, Northern Lumber Co., Poland, N.Y., as president of the Northeastern Lumber Manufacturers Association.

JAMES B. GRINNELL is new district manager in Boston, Mass., for Dant & Russell, Inc., Portland, Ore. He formerly headed his own lumber sales firm in Vancouver, B.C., and formerly served with Seaboard Lumber Sales Ltd. in Vancouver and New York City.

JAMES KENNEDY has been named superintendent of maintenance and construction at the Union Lumber Co. at Fort Bragg. He succeeds J. J. Tallman who retired. Kennedy has been with Union since 1918.

R. W. ROBERTS has been named lumber sales manager for the three sawmills of Diamond Lumber Co., Tillamook, Ore. Roberts has been in lumber wholesaling since graduation from the University of Oregon in 1949.

J. HAROLD SAMPSON, White Pine Sash Co., Spokane, Wash., is the new president of Timber Products Manufacturers Association. George J. Tichy is secretary. New members of the board of governors are Leonard Luby, The Diamond Match Co., and Grant Dixon, Jr., Exchange Lumber and Monufacturing Co., both Spokane.

G. ARCH KINGSLEY, Kingsley Lumber Co., Portland, Ore., is the new president of the Douglas Fir Export Co. Other officers include R. L. Dickman, Dickman Lumber Co., Tacoma, Wash., vice-president for Washington; Willard T. Evenson, Wauna Lumber Co., Wauna, Ore., vice-president for Oregon; William T. Dorsey, DuBois Lumber Co., Vancouver, Wash., secretary-treasurer; and B. K. Frank, general manager.

THOMAS B. GLAZEBROOK, timber staff officer of the Klamath National Forest in Oregon, has moved to Washington, D.C., to become assistant to the chief of logging engineering for the U. S. Forest Service. He has 15 years' forest service experience, most of it in timber management and valuation in California.

ALFRED W. TEICHMEIER has been named to the newly created post of sales manager of hardwood plywoods at United States Plywood Corp. He has been with U. S. Plywood for 16 years, most recently was manager of the Burnside, Chicago., Ill., branch.

LOUIS. A. PATRONSKY has been named product development engineer for Pack River Tree Farm Products, Spokane, Wash. He has served as director of product development for Wabash Screen Door Corp., and taught and directed research at the University of Michigan. In recent years he has been particularly active in the particle board field.

NEAL CREEK LUMBER CO. expects to be operating in a new sawmill in July. The new unit replaces a mill destroyed by fire last fall, will have a capacity exceeding the 85,000-foot-a-day output of the previous installation.

A VENEER AND SAWMILL IN BRAZIL is nearing completion, will have a capacity to process more than 1000 cubic meters of logs monthly. The installation is owned by Companhia Amazonas of Belem, Para, Brazil, is located at Meruoca about 150 miles from the mouth of the Amazon. The firm is headed by Daniel M. James, Lexington, Ky., and Robin Hollis McGlohn, Belem resident. Plywood production is eyed in the future.

WILLIAM FAULL, Hardes Lumber Co., Bradford, Pa., is the new president of the Northeastern Loggers Association. Henry Waldo, Franconia Paper Co., Lincoln, N.H., is vice-president and George Rodgers, Fisher & Young Lumber Co., Titusville, Pa., secretary. Named to the board of directors were Howard Hanlon, Cotton and Hanlon, Odessa, N.Y., Carl Siriani, Siriani Lumber Co., Green, N.Y., and Maurice Goddard, secretary of the Pennsylvania Department of Forests and Waters, Harrisburg, Pa. They will serve as an executive committee with the new officers.

WILLIAM SWINDELLS, president and director of The Willamette Valley Lumber Co., Dallas, Ore., has been elected a director of the Southern Pacific Company. Swindells is also president and director of the Willamette National Lumber Co. and Western Veneer & Plywood Co.; vice-president and director of the Santiam Lumber Co., and Western Kraft Corp.; and director of Western Corrugated, Inc., of Oregon.

BELDON C. KELLER has been named manager of Lakeview Lumber Products Co., Lakeview, Ore., succeeding Bruce Nugent who has resigned. Keller for the past six years has been executive vice-president of Pickering Lumber Corp., Standard, Calif.

STOCKHOLDERS OF CASCADES PLYWOOD CORP., Lebanon, Ore., have re-elected the following officers: Charles W. Fox, president; B. V. Hancock, executive vice-president; A. E. Anderson, vice-president; Robert T. Conklin, vice-president; K. E. Ross, treasurer; Paul L. Boley, secretary. Re-elected to the board were Fox, Hancock, Anderson, Boley and George P. Birkelund, Prewitt Semmes, Hugh R. Kirkpatrick, Charles E. McCulloch and Alger Chaney.

W. W. JACKSON, general sales manager of J. H. Baxter & Company, San Francisco, Calif., has been elected chairman of the board of directors of the American Wood Preservers Institute.

RAYMOND J. HOYLE, chairman of the department of forest utilization at the State University College of Forestry at Syracuse University, Syracuse, N.Y., will retire this summer, ending 40 years of service to the college. Hoyle supervisd reorganization of the forest utilization curriculum, had an active part in initial planning of the newly dedicated Hugh P. Baker Laboratory, and has been fully responsible for development of an active program of research in the field of forest utilization at the college.

G. F. JEWETT of Spokane, Wash., a former president of Potlatch Forests, Inc., and for years president of the Western Forestry & Conservation Association who died November 23, left an estate with an inventory value of $5.6 million, which includes $3,225,552 stock in the Weyerhaeuser Timber Co.

LOW-COST END-COATING FOR LOGS, LUMBER, TIMBERS

- Controls end-checking and reduces losses due to degrade
- Economical to use . . . costs just about one cent or less per square foot, applied
- Easy to apply by spray, brush or swab
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Redesigned engines produce *increased* power without strain from new combustion chamber and valve position . . . more usable power that's "bred for the job" . . . at low rpm to keep operating and maintenance costs low. New quick-starting 12-volt ignition.

Biggest windshield—1,181 sq. in.—and *widest* cab in their class! New "Silent-Vent" door wings. New, wider front and rear springs. Exclusive level-riding 5-point cab mounting. Bigger brakes with more lining area, larger cylinders and boosters for quicker, easier stops.

Other INTERNATIONALS, to 96,000 lbs. GVW, round out the world's most complete line.

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How many SHAFER® bearings can you see?

(see answer below)

Designed and built to withstand severest conditions of dirt and shock loads, Shafer Self-aligning Bearings are used throughout this modern sawmill.

How Many?

In this one photo of the vertical resaw cant transfer conveyor alone, there is either a Shafer Normal or Heavy-duty Pillow Block, or a Heavy-duty Take-up and Frame Unit—everywhere a shaft turns. We counted only those we could see and found more than 70. How many can you count?

Clues on Where to Look

1. Look for the spots where moderate shock loads, average operating conditions and normal shaft expansion can be expected and you'll find Shafer Normal-duty Pillow Blocks.
2. Look for the points where you'd expect severe shock loads and you'll find Shafer Heavy-duty Units that can take those radial and thrust shock loads—even under misalignment—and have capacity to spare.
3. Look for the places where chain take-ups have to take a terrific pounding, yet deliver full capacity and long life. At every one you'll find heavy-duty Shafer Take-up and Frame Units in welded steel frames capable of taking full load in either direction.

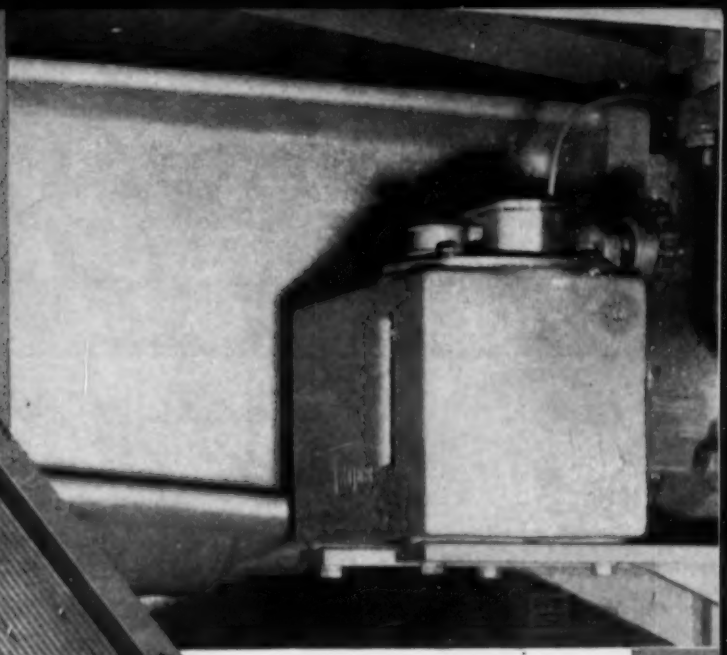
Throughout your mill where operating conditions are severest, you'll find a spot where Shafer design and performance can be counted on. Ask your Shafer or CHAIN Belt Representative to help you make the best choice—or write today for Shafer Bearing Industrial Catalog, Shafer Bearing Division, CHAIN Belt Company, Downers Grove, Illinois.

CHAIN BELT COMPANY

SHAFER BEARING DIVISION

DOWNERS GROVE, ILLINOIS

Right: This detailed photo shows brass chain race inserts. Arrows indicate four outlets for forced-feed lubrication to the race.



Above: Geared pump-drive for forced-feed lubrication system.

2 NEW COST-CUTTING OPTIONAL FEATURES FOR THE DIEHL No. 750 RIP SAW

Two new optional features — *which more than pay for themselves by reducing repair and labor costs* — are now available for the long-established Diehl No. 750 Straight Line, Glue Joint Rip Saw.

These features are brass chain race inserts and forced-feed lubrication.

The inserts increase wear life of the high-alloy cast feed chain, by permitting it to run in a softer, lubricated brass bed. If wear does necessitate replacement, *cost of the insert is approximately 1/7 that of replacing the standard chain race.*

The inserts are made of solid 7/16" thick brass, and fit in the chain race and chain race swivel. They are jig-drilled and machined — eliminating the possibility of misalignment when replacing. The inserts may also be reversed to offset uneven wear.

Forced-feed lubrication virtually eliminates manual oiling — *cutting labor costs and giving added protection to the machine.*

This lubrication is operated under 160 psi of pressure — with pressure obtained by a geared pump in the main reservoir. Four individual lines run directly to the oil grooves in the brass inserts with four additional lines going directly to the bottom surface of the feed chain links.

The brass inserts and forced-feed lubrication can be ordered on new Diehl No. 750 Rip Saws, and these machines now in use may be shipped to the factory for conversion.

Find out now, how these two optional features *cut costs and downtime—increase efficiency and profits.* For complete details, see your Exclusive Diehl Representative or write for Bulletin IL-750.

Standard of Comparison in the Woodworking Industry

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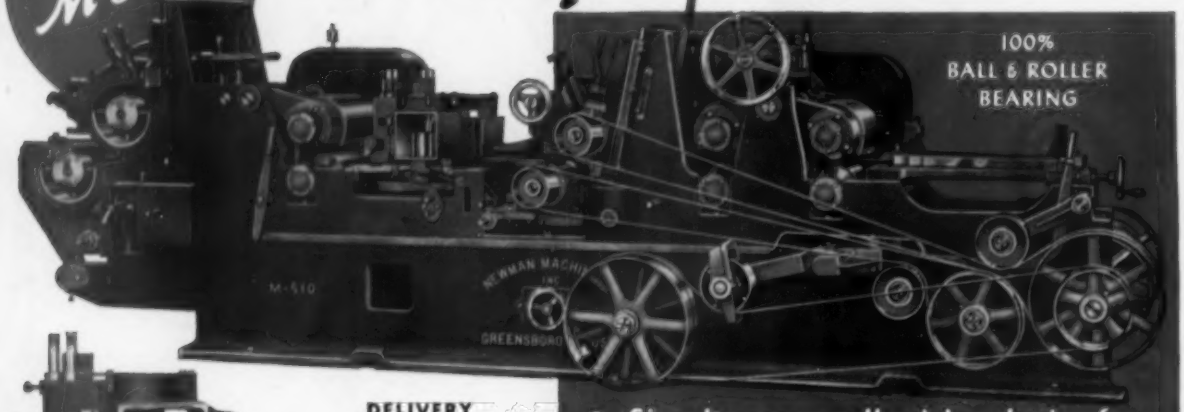
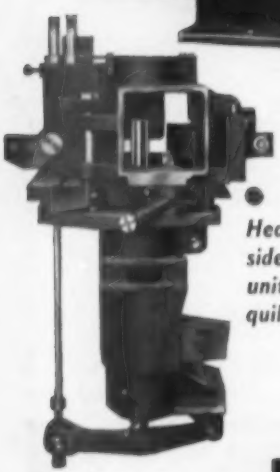
A New 10" Roll PLANER & MATCHER with feeds to 250 feet per minute

Newman M-510

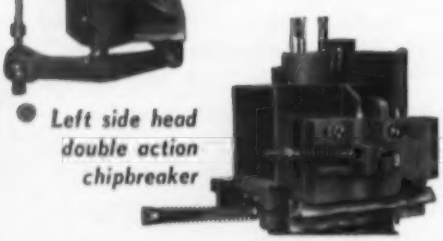
A medium priced machine with every desirable feature



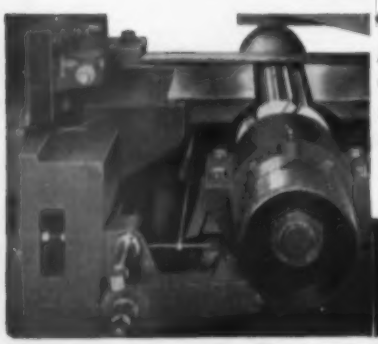


Heavy duty side head units of long quill design

DELIVERY FROM STOCK ***IF YOU HURRY***



Left side head double action chipbreaker



Massive vibration free bed plate after bottom cylinder

- Simultaneous roll raising device for front bottom feed rolls
- Quick release for pressure bar
- Quick release for left side head
- All Sprockets steel—heat treated
- Flame hardened bottom bed plates and pressure bar
- Feed works reversible
- Wear resistant rigid solid steel long guide
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Newman Machine Co., Inc.

GREENSBORO, NORTH CAROLINA, U. S. A.

Safety Engineering

OTIS R. JOHNSON (left), president, Union Lumber Co., Fort Bragg, Calif., accepts trophy for 1956 from Ed Carpenter (right), resident manager, The Pacific Lumber Company, Scotia, California, 1955 trophy award winner.

Union Lumber Company Receives Johnson Award

• Otis R. Johnson, president, Union Lumber Co., Fort Bragg, Calif., received the perpetual C. R. Johnson Memorial bronze-on-burl plaque at the fourteenth annual award dinner held April 12 in Fort Bragg. The 1956 winning score for the company was 19.8.

The C. R. Johnson Plant Division Award, and the Achievement Award, were both received by Willits Redwood Products Co., Willits, Calif. Plant winning score was a new low record index of 4.03 set by WRP employees, partly responsible for the company achieving an overall reduction in disabling injuries of 53% over previous years.

The C. R. Johnson Woods Division Award was received by Union Lumber Co.

Mr. Roberts, Foreman of Yarding and Logging, was recipient because of his crew being recently acclaimed National Champion loggers, having achieved an all time woods safety record of six consecutive years without a disabling injury. Woods winning score was 22.2.

An additional Safety Award was presented on behalf of the California Lumbermen's Accident Prevention Association inasmuch as the C. R. Johnson group is one of five CLAPA competition districts. The District Award was also won by the Willits organization who scored the lowest index on a slightly different competition basis.

"FINISH THAT CUT AND WE'LL KNOCK OFF FOR TODAY."

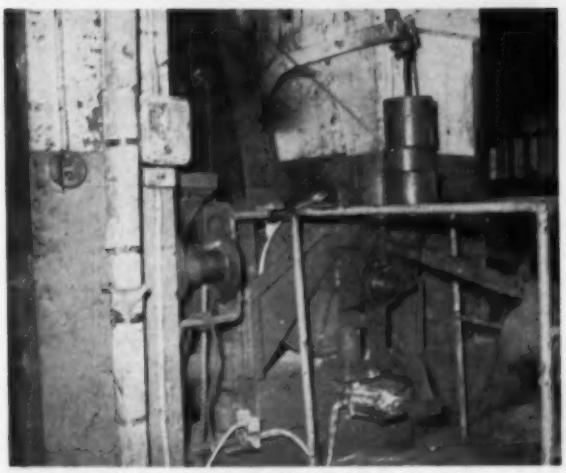
EMERGENCY STOP switches on resaw rollcase have rubber hose mounted on toggles to avoid injury to workers caught by splinters and pulled towards feedworks. As worker is pulled against switch, it shuts off the power, stopping feedrolls. (Photos: B.C. Lumber Manufacturer's Association, Vancouver, B. C.)

Resaw Feed Uses Emergency Stop

• Men feeding rough stock to a vertical band-type resaw face the risk of being caught by slivers on stock and being pulled forcibly into the feed-rolls.

The safety committee at B. C. Manufacturing Company Ltd., New Westminster, B. C., built a device to stop the feed-rolls, shown in photos. Two toggle-switches are placed at the two feed stations, mounted to frame the rollcase. Toggles are covered with a length of rubber hose. If a man's sleeve or glove is caught by a splinter, he is pulled toward the toggle-switch, which his hips or thigh will touch, throwing the switch.

Head millwright Helge Holmberg of B. C. Manufacturing Co. Ltd. did the design and practical installation.



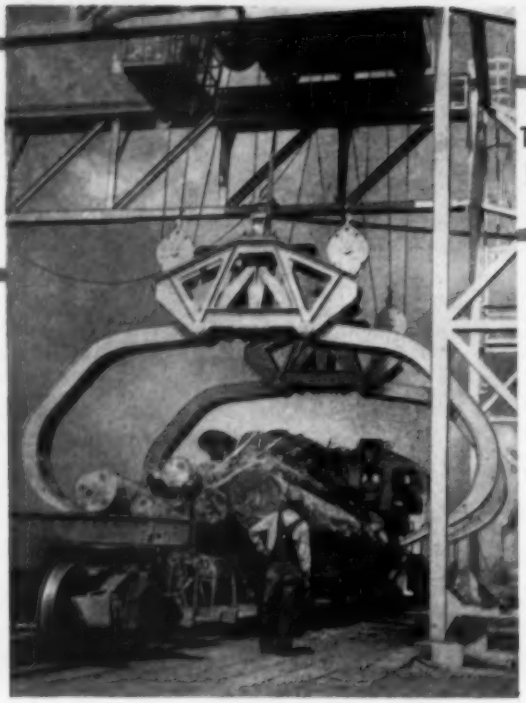
WHEN POWER goes off, the air-valve separates components of friction drive and applies brake, so that the feed-rolls will not drag the worker in towards vertical bandsaw, illustrated above.

RE-SET SWITCH must be activated before the feed-rolls can be started. Chief Engineer Henry Wright, B. C. Manufacturing Co., Ltd., demonstrates. Men must walk about 10 ft. to re-set device.

FLEXIBILITY • ECONOMY • SAFETY

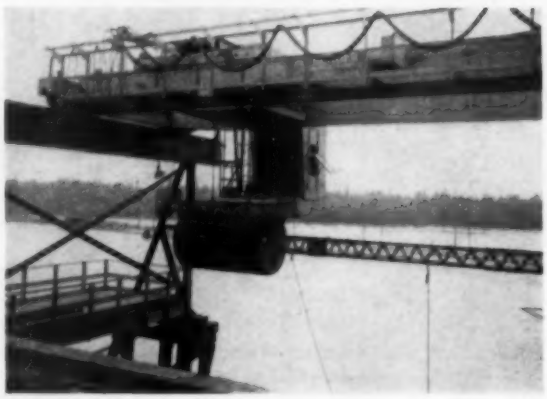
THEY'RE ALL BUILT INTO

BERGER BRIDGE CRANES



Right — Berger grapples — the world's largest—ready to lift an entire carload of logs and gently lower it into the pond at Weyerhaeuser Timber Company's Longview, Wash., mill. Grapples are controlled individually or in unison by operator in cab on Berger 75-ton electric bridge crane. Special remote control device locks arms in closed position.

Transporting peeler blocks (the tops in wood value) . . . unloading and dumping a truckload or a carload of logs at a time . . . preventing log breakage . . . reducing the accumulation of debris to a minimum . . . all these time and money-saving values are built into BERGER BRIDGE CRANES and more. There is far less damage to trucks or railcars. Safety is another extra value. FLEXIBILITY — in both design and application — is part and parcel of every hoist-and-carry system produced and installed by Berger. The word Engineering in our company name means what it says. We design and precision-manufacture all kinds and sizes of bridge cranes and they're engineered to the exact requirements of the job they have to do. Your needs are our blueprints. To meet your specifications, all of Berger's designing, manufacturing and engineering facilities are yours for the asking. Write or call us NOW!



***Above* — Berger 15-ton electric crane on Crown Zellerbach operation, St. Helens, Oregon, transporting peeler block from millpond to barker. Crane serves waterfront and mill area ahead of lathe.**

Loaders . . Yarders . . Fairleaders . . Blocks . . Air Tongs . . Bridge Cranes . . Loading Booms

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for these first-rate "Touch of Gold" advantages that mean better performing, longer-lasting saws and lowest cost sharpening. The Norton grinding wheel plant at Santa Clara, Calif., supplies West Coast Distributors with 44 ALUNDUM wheels and other types you need. Other Norton Distributors are located in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. NORTON COMPANY, Worcester 6, Mass. Behr-Manning Company, Troy, N. Y., Division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

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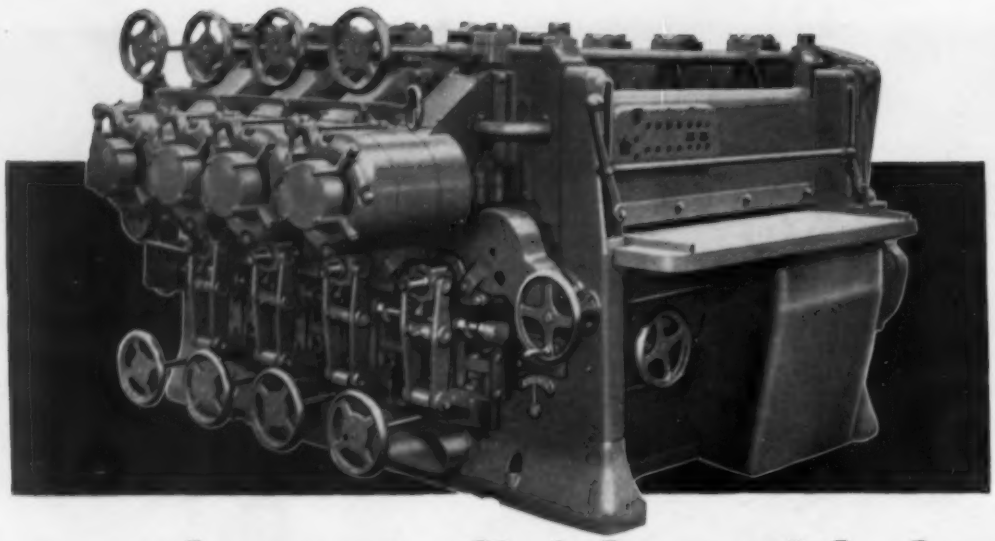

Improved way to finish particle board

eliminates chip-tearout problems

Mills using Yates-American Double-Deck Sanders come up with performance figures that are eye-openers!

You must agree that we at Yates-American can be unbiased in discussing the merits of surfacers versus sanders in chip-core operations. After all, we make both types of machines.

We feel that Yates-American surfacers are the finest. But — it is our honest opinion that *any* surfacer has *limitations*, when it comes to finishing particle board.

We estimate that about 60% of the end-use requirements for particle board call for a smooth finish you can get only from a *sander* — the Yates-American Double-Deck, in particular. Leading mills throughout the country back us up on that!

Does the Entire Job!

With the Yates Sander, finishing particle board is done in *one* operation:

It removes up to 3/16" of stock (depending upon density of board) —at rates up to 50 feet per minute. It holds tolerances of less than ±.002" over an entire sheet — *that we guarantee!*

There are no expensive carbide knives to joint, regrind, and reset. *No knife marks or chip tearout.*

Preferred by Leaders!

Leading companies like these have already purchased Yates-American Double-Deck Sanders:

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Columbia Hardboard Co.
Everett, Washington

Curtis Companies, Inc.
Clinton, Iowa

Elmen Gray Co.
Waverley, Virginia

Granite Board, Inc.
Goffstown, New Hampshire

Rock Island Millwork Co.
Rock Island, Illinois

Wabash Screen Door Co.
Minneapolis, Minnesota

Weyerhaeuser Timber Co.
North Bend, Oregon

Wynnewood Products Co.
Jacksonville, Texas

Don't you think a Yates Double-Deck Sander should figure in *your* particle board plans? Ask your nearby Yates-American man to make recommendations. Or write, wire, or phone us today at Beloit.

Yates-American
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First with the *Finest* in woodworking machinery. Established in 1883

MATCHERS • MOULDERS • SURFACERS • RIPSAWS • RESAWS • SANDERS

WW-9

How's this for SANDPAPER LIFE!

Here are some figures that are hard to believe — we blinked once or twice ourselves, when we first saw them. But they're fact — actual performance figures supplied to us by two reputable companies, names you'd recognize at once.

Both mills are finishing particle board with a Yates-American Double-Deck Sander and are removing up to 3/16" of stock. This is what they report on sandpaper life:

First two pairs of drums	1200 to 1500 hours
Third pair of drums	500 to 700 hours
Fourth pair of drums	150 to 200 hours

We repeat — these are not *our* figures. They've been furnished to us by *two different mills* and have been confirmed and re-confirmed.

STANDARD ENGINEER'S FIELD REPORT

PRODUCT CHEVRON* INDUSTRIAL GREASE

FIRM RICKINI LUMBER CO. Lakeside, Oregon

Chevron* Grease Doubles Bearing Life at 450°F.

Original set of burner bearings (see arrow), lubricated with Chevron Industrial Grease (formerly Calol), is still in service at the Rickini Lumber Co., after 18 months operation. Stirl Dunlop, Mill Superintendent, says, "Chevron Industrial Grease stays on these bearings and performs satisfactorily —even when burner temperatures reach 450°. In my 25 years experience I've found that burner bearings ordinarily last about eight months in this kind of severe service. The bearings on our burner, installed a year and a half ago when the mill began operation, still show no sign of trouble. Because of its resistance to high temperatures, we now use Chevron Industrial Grease on all grease-lubricated high-speed bearings in the mill." Mr. Dunlop also reports that using one grease and one gun ends lube errors.

Advantages of CHEVRON* Industrial Grease

- Mixes with any grease
- Melting point, 500° F.+
- High water resistance
- Extreme work stability
- Recommended for high or low-speed bearings.
- Top wear-prevention qualities
- Rust protective
- Non-corrosive
- Pumpable over wide temperature range

For More Information contact your Standard Engineer or Representative, or write Standard Oil Company of California, 225 Bush Street, San Francisco 20, California.

*THE CHEVRON BRAND covers the line of industrial products formerly sold under the Calol name. This is a name change only. The high quality and specifications remain the same.

CHEVRON Industrial Lubricants

TRADEMARK "CHEVRON" AND DESIGN REG. U.S. PAT. OFF.

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There's a LINCK GANGSAW for everybody!

$8,800 to $100,000

If you believe a Linck Gangsaw won't cut hardwoods profitably or if you believe a Linck Gangsaw is only for the king-size operator, then this is especially for you. Whatever the size of your operation, whatever size logs you normally cut, whether you cut hardwoods or softwoods, there is a Linck Gangsaw that will reduce your operating costs. Any way you figure it, the less you have to shell out for production, the more you'll be able to put in your pocket.

All we ask is the opportunity to show you what a Linck Gangsaw can do for you.

CORLEY MANUFACTURING CO.
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Gentlemen:
I'm old fashioned enough to believe in sawmill profits. Without obligation to me, tell me more about Linck Gangsaws.

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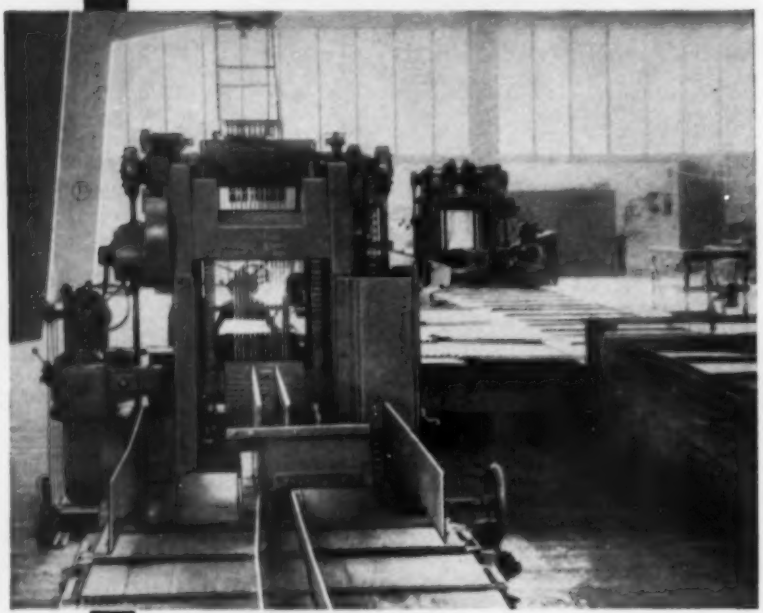
TANDEM GANGS MADE PRACTICAL WITH AUTOMATIC SAW SHIFTING

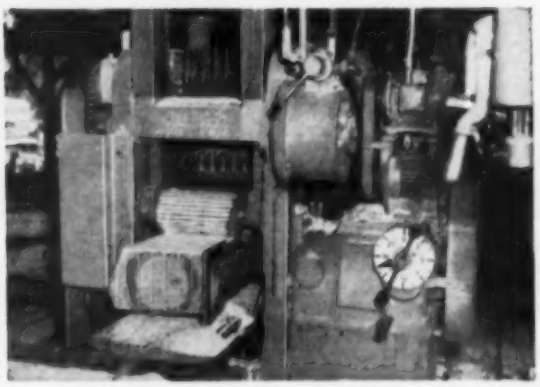
Eliminates Log-Sorting

Pictured below are two Linck Gangsaws arranged in tandem.

Logs enter the Linck in background. This machine is equipped with an exclusive Linck development, the Automatic Saw Width Adjuster. Push-button controls *instantly* shift banks of saws *between logs*, so that you get maximum footage and maximum grade without pre-canting and without log-sorting. The cants produced on the first Linck are then processed through the second Linck Gangsaw in the foreground.

High production, quality lumber, fewest possible workmen.





Pre-slabbed cant being turned into accurate lumber on a small Linck Gangsaw, Model K-45.

Corley MANUFACTURING COMPANY
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when you're in
the particle board game . . .

your ace in the hole is *Borden*

You can count on an ace every time when you get the Borden deal on high-quality wood-chip adhesives. That's because Borden pioneered in the development of this exciting new process with the *right* adhesive for every type of particle board . . . flake, splinter, strand and extruded splinter. With this know-how, our adhesive specialists can recommend the exact adhesive for *your* operation . . . depending on the species of wood used, moisture content, chip geometry, processing equipment, cure cycle, density . . . and the characteristics desired in the finished board. And you can depend on a Borden adhesive being fast curing, low in formaldehyde odor, ready for use. Available, of course, where and when you need it, in just the quantity you want. For further information on Borden wood-chip adhesives, contact The Borden Company, Chemical Division, at Seattle, Wash.; Springfield, Ore.; San Francisco, Calif.; or Los Angeles, Calif.

IF IT'S A *Borden* *Chemical* IT'S GOT TO BE GOOD!

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Record Production · Big Weight Saving

4-Cylinder P&H Industrial Diesel 144 H.P. at 1800 rpm—Weight 2,200 lbs.

You can't beat P&H diesel power for sawmills

P&H Diesel delivers maximum service at minimum cost

WHY?

Here are the 4 BIG reasons

1. DEPENDABLE POWER FOR HIGHER PRODUCTION . . . The P&H Diesel supplies power to cut cleaner, faster and with fewer interruptions. It reduces costly down-time for restarts. When the blade hits knots, this rugged, highly responsive P&H Engine doesn't falter.

2. LIGHT IN WEIGHT—EASIER TO MOVE . . . Where the compact, lightweight P&H Diesel replaces heavier diesels of comparable power, weight savings up to 1,000 lbs. are commonplace. Just what you want for portable sawmills.

3. LESS DOWN-TIME . . . For easier, faster maintenance the P&H Diesel has 25% fewer parts. All wearing parts are interchangeable. After thousands of "running" hours, the "unitized" P&H power assembly can be removed and replaced with a new one in only 30 minutes.

4. LOWER OPERATING COSTS . . . The P&H Diesel operates best with No. 2 furnace oil. And because it is such a highly efficient engine, it burns less of this low cost fuel.

Industrial and Automotive P&H Diesels are available in 2, 3, 4 and 6 cylinder models rated from 40 to 280 H.P. For complete information on *money saving* P&H Diesel Power contact your nearest Pacific Coast P&H Dealer OR write: P&H Diesel Engine Division, Harnischfeger Corporation, Crystal Lake, Illinois.

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THE Lumberman
LUMBER PLYWOOD BOARD WOOD MANUFACTURING

Volume 84 • Number 6
MAY 17, 1957

ANNUAL BOARD REVIEW

In this issue of THE LUMBERMAN we present a comprehensive review of the fast-growing board industry, including . . .

- **INSULATING BOARD**
- **HARDBOARD**
- **PARTICLEBOARD**
- **FLAKEBOARD**

On the ensuing pages you will find the following material:

- A review of the industry and a look at the future.
- Descriptions of the basic board manufacturing processes.
- By-lined articles by authorities in the board field.
- Articles on these board plants:
  Columbia Hardboard Co., Everett, Wash.
  Cascades Plywood Corp., Lebanon, Ore.
  Roddiscraft, Inc., Arcata, Calif.
- Highlights of the International Consultation on Insulating Board, Hardboard and Particle Board, held at Geneva, Switzerland, January 21-February 5, 1957.
- Pictorial presentation of typical board uses.
- Tables, charts and maps on world production.
- Directory of U. S. board plants.

Booming Board Industry Shows Growth Potential

Hardboard, insulating board and particle board offer wide variety of products made from milling residuals.

CINDERELLAS IN THE NATION'S woodpile have become more common within recent years, but the newest one to make her debut has a fresh, new look that indicates a brilliant future.

We refer to the flourishing board industry, which in its various components is reviewed in more detail in this special issue of THE LUMBERMAN. Although there is still some confusion in terminology, the board industry generally is conceded to include fiberboard, which embraces insulating board and hardboard, and particle board, which includes several other associated products such as flakeboard.

The utilization significance of these industries is that they offer another outlet for lower grade tree species and/or chipped or flaked milling residuals, such as slabs, edgings and trim ends, as well as planer shavings. Thus the products join with kraft pulp to provide economic outlets for vast amounts of raw material either unused previously or diverted for lower grade products. This offers another technological means for prolonging the nation's timber supply.

The Stanford Research Institute Report, "America's Demand for Wood," in appraising the future of the building board industry, considered only hardboard and insulating board. The significance of the newest Cinderella, particle board, had not been fully appreciated when the report was in preparation in late 1953 and 1954.

However, the Institute Report stated that consumption of building board had grown more than ten fold since 1929. Greatest relative increase had been in hardboard, with about 16 times as much hardboard used in 1953 as in 1929. Insulating board had also shown a healthy 700 per cent increase during the same period.

LOOKING AHEAD, the Institute Report predicts that by 1975 insulating board, the longest in production of the board products, will account for about 34 per cent of the market for exterior wall sheathing material, contrasted to four per cent in 1920. This gain will be made largely at the expense of lumber. Greater quantities will be consumed, too, for use as facing material on interior walls and ceilings.

Hardboard, which started production about 10 years after insulating board, is widely used by the furniture and fixtures industry. It is enjoying accelerated usage by the construction industry — both residential and non-residential — because of its relatively low cost and adaptability to many uses.

Looking ahead to 1975, the Institute Report predicts that a total of slightly over three billion square feet (⅛ inch equivalent) of hardboard will be used in all categories. In new residential construction, about 860 million square feet will be used. It is expected that by 1975 hardboard will have about eight per cent of the market, competing against plywood, for underlayment material, five per cent of the interior wall surfacing market and eight per cent of the ceiling surfacing market. Gains are also expected in the use of hardboard as roof sheathing and for doors, cabinets and trim.

In non-residential construction hardboard is largely used for concrete forms and interior partitions and on the farm for many exterior uses. By 1975, the Institute Report expects that 350 million square feet of hardboard will be consumed in non-residential construction.

HARDBOARD IN MANUFACTURED products is expected to zoom to 630 million square feet by 1975. Home consumption is expected to climb to 360 million square feet by 1975.

But no one was quite aware of the growth potential of Miss Particle Board. Quiet and unassuming, this infant has suddenly blossomed into the beginnings of maturity. Already, industry economists have called her "a giant in the making." As is to be expected, anyone growing that rapidly develops some growing pains.

Particle board actually did not appear on the commercial market until about 1946. Its growth has been spectacular. In western Germany alone, for instance, volume of board produced has increased from approximately 4½ million square feet in 1950 to 75 million square feet (¾ inch basis) in 1955. There now are about

FIGURE 1. Insulation board plants in the U. S. in 1956.

35 plants in western Germany, three in England and several in Switzerland.

Although the plants in the United States and in England rely upon woodworking residues, in Continental Europe higher quality products rely upon round wood from forest thinnings. Thus another outlet for tree farm harvests is indicated in the look-ahead.

Currently in the United States about 50 wood particle board plants are either producing or are being built. Announcements for new plants are still being made. Total productive capacity of the 50 plants, when in operation, will be nearly one billion square feet annually (based on ⅜ inch thickness equivalent). That compares with present estimated annual production of three billion square feet (half-inch basis) of insulation board and 1.75 billion square feet (⅛ inch basis) for hardboard. Thus, the output of the particle board industry is catching up rapidly with that of the longer established insulation board and hard board plants.

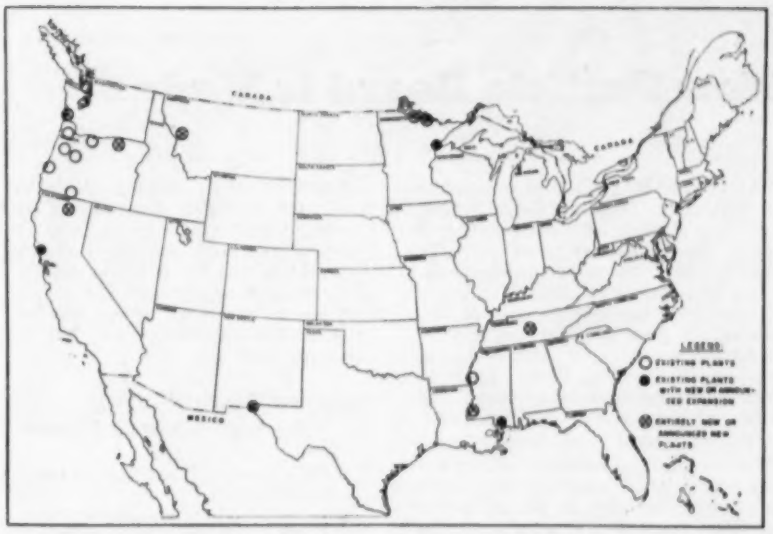


FIGURE 2. Hardboard plants in the U. S. in 1956. Includes resin-bonded types plus conventional, when product is sold as hardboard.

PARTICLE BOARD IS NOT a substitute material. It is a newly developed, engineered product with its own characteristics and advantages — and some disadvantages. It is essentially a product consisting of machined wood particles, such as splinters, flakes and shavings of a controlled moisture content and size, bonded together with a synthetic resin adhesive into panel form under pressure and heat.

What has given particle board production its stimulus? Both in this country and abroad, the furniture industry can claim the credit for adding the dollar incentive for this burgeoning output. By far the most extensive use for particle board is as furniture core stock for both high-pressure laminates and hardwood veneers.

Here particle board threatens to supplant a long established competitor, edge-glued lumber cores. These are still being made with costly, old-fashioned techniques in the established U. S. furniture industry. But particle board is stepping in fast. One authority states that about 500 million square feet of lumber core annual market offers a big potential for particle board. Probably particle board will replace lumber core almost entirely in the years ahead.

But not content with taking on the lumber core market, particle board is aggressively giving battle to plywood, too. Its strength and physical properties approach those of plywood. Absence of face checking and ability of such panels to stay flat in service even when unsupported will increase their use. Pleasing face patterns are being imparted through unusual flake arrangements. So look for more market competition between plywood and particle board as the product becomes more refined and engineered.

ONE OF THE MAJOR problems facing particle board manufacturers is the lack of standard specifications. There is still little correlation between products from different manufacturers. In many cases, specifications have been developed for a particular use.

The industry needs uniform specifications to enhance consumer acceptance. This probably will be done in the future, because a Particle Board Association has been organized.

But those interested in getting into the particle board industry should proceed with caution. It requires large capital outlays. Basic surveys concerning raw material supply, type of process to be used and market potentials (correlated with shipping costs to consuming areas) should be made before any decision on plant investment is made. The services of a reliable engineering firm should be enlisted before plans are formulated.

The continued growth of the particle board industry is certain. Improvements in material processing and advancements in adhesives will result in a better product. Boards will be developed for thermal and acoustical insulation properties. New decorative effects will be designed for faces.

Keen competition is ahead, not only within the particle board industry but also between it and lumber, plywood and perhaps hardboard. Products like hardboard and particle board presage the forest industry of the future, when lumber-like products will be extruded to almost any design and pattern.

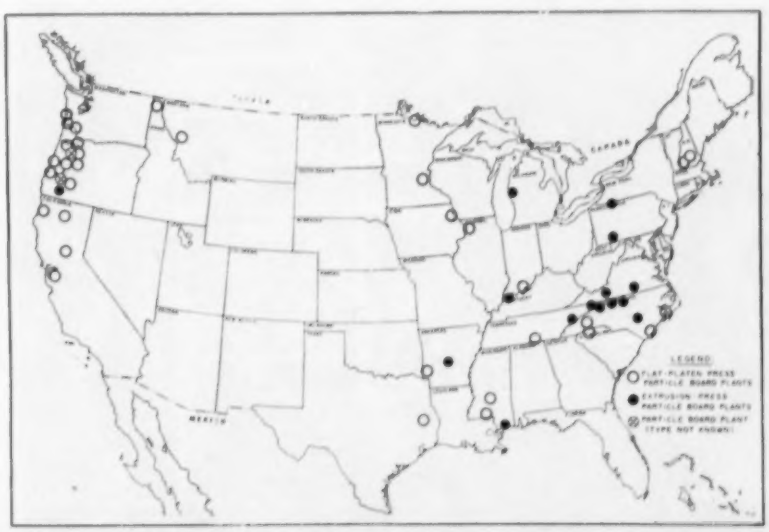


FIGURE 3. Resin-bonded wood particle board plants either in production or under construction in the U. S in 1956.

How Particle Board is Made

PARTICLE BOARD, also referred to as chipcore, chipboard and waferboard, is a mechanical combination of wood chips and a thermosetting binder accomplished under elevated temperatures and pressures. Particle board differs from hardboard, such as Masonite, in that densities are not as great (generally .7 and under as against .7 to 1.1), higher resin or binder content in particle board and size and geometry of wood material.

Particle board manufacture is the most promising, profitable outlet for sawmilling and lumber products manufacturing residues and the utilization of thinnings, cull and weed trees. In a sense, the product is not a new development. Advances in the development of versatile, low cost synthetic resin adhesives and rising stumpage costs make this material essentially a residue utilization process, competitive and profitable. An intriguing characteristic of particle board manufacture is the automatic material flow in all of the successful processes, with resulting low labor costs.

Forty tons weekly of residue material is the minimum requirement for extrusion plant operation. Multiplaten press operation requirements are greater.

Residues can be shavings, chips, slabs, trimmings and round stock. Sawdust is undesirable for particle board but can be used in molded products. Any species of wood can be used and, in fact, mixtures of several species are acceptable. Bark reduces the desirable properties of the board and should be excluded or screened out in the process. Initially, the residues can be in any condition of dryness from green to kiln dried. Optimum moisture content of the chips at the blender is from five to eight per cent.

Equipment Required

- Wood hog, chipper or hammermill
- Chip drier (if residues are not kiln dried)
- Air conveyor installation for chip movement
- Sizing screens for chip grading
- Storage silo for chip sotrage
- Metering unit for chips
- Blender for chips and glue
- Glue mixer for preparing the binder
- Press or extrusion equipment
- Saws, trim, cut-off and/or sizing
- Automatic stacking unit
- Warehouse and packing equipment and space

Binder Requirements

- Urea — formaldehyde thermosetting synthetic resin is most commonly used for board intended for interior use. Other adhesives and glues commonly used in the lumber industry are in limited use or under investigation.
- For exterior use or where a high degree of water resistance is required, more expensive phenolic resins are required. In some instances prior to mixing the binder with the chips, chips are automatically sized with a wax emulsion to impart water resistance. However, increased water resistance accomplished in this manner is at expense of reduced strength properties in the board.
- Certain binders require the use of a separate catalyst to insure proper timing in the press.
- Conservative estimates on total binder costs are: approximately 1c of glue/pound of wood or 2½c per sq. ft. of ¾" board of approximately .55 specific gravity.
- Ratio of binder to wood chips vary with the process and type of board produced, ranging from 5 to 12 percent (dry weight) of the wood chips. In many instances the adhesive is extended by the use of flour which alters the property of the board produced.

Desirable Properties

Particle board properly manufactured should have the following properties:

- Dimensional stability equal to wood.
- Constant density throughout the board.
- Good screw holding and nail holding properties.
- Machinability.
- Minimum warping tendency.
- Good compressive and shear strength.
- Reasonable flexure and modulus of rupture in bending.
- Good gluing properties.
- Relatively smooth faces.

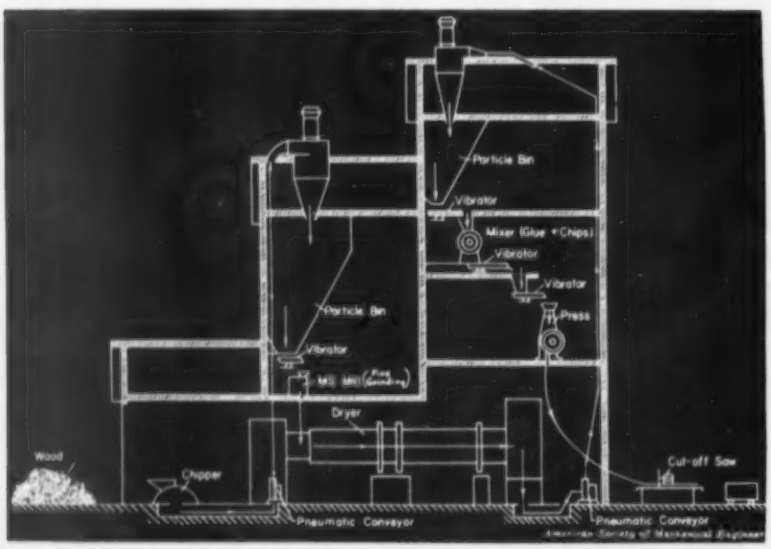
Markets

The two principal markets for particle board are:

- Core stock
- Store fixtures and wall partitions

Particle board has found its biggest use as a substitute for solid lumber core stock in the manufacture of veneer furniture and as core stock in plastic overlaid table tops and kitchen cabinet fabrication. Decorative boards such as U. S. Plywood's "Novoply" and Pack River Lumber Company's "Tenex" are in demand for store fixtures, wall partitions, panels and sliding doors. In this latter market the board is not covered with a veneer or decorative overlay but is either finished or painted. In general, a higher quality board is used for this market.

From all reports, demand for particle board is on the rise and experts claim that the market has not been tapped. In considering production of a board the most important phase of



SCHEMATIC DIAGRAM of the Kreibaum Vertical Extrusion Process. (From "Wood Particle Board Handbook", North Carolina State College, Raleigh, North Carolina).

any survey should be market investigation. Not only for the more obvious reasons of determining the ability of the market to absorb production and competitive position in the market, but because needs of potential users in the area to be serviced will dictate type, size and quality board to be produced and process to be used in production.

The tremendous potential of particle board will be attained when building codes and regulations permit its use as sub-flooring, sheathing, roof boards and underlayment for floor coverings such as linoleum and tile. Properties required by a material to perform in these applications are available in particle board and the changes permitting particle board in these applications should be forthcoming soon. Standards must be established for the quality of the board to insure satisfactory performance in these applications.

Types of Residue Used by Particle or Flake Board Operations

PLANT	Location	Type of Residue
CASCADES PLYWOOD CORP.	Lebanon, Oregon	Plywood residues, planer shavings
AMERICAN FURNITURE CO.	N. Wilkesboro, N. C.	Furniture manufacturing residue
AMERICAN FURNITURE CO.	Martinsville, Va.	Furniture manufacturing residue
BROYHILL FURNITURE CO.	Lenoir, N. C.	Furniture and veneer manufacturing residue
CALDWELL FURNITURE CO.	Lenoir, N. C.	Furniture and veneer manufacturing residue
CAVALIER CORP.	Chattanooga, Tenn.	Kiln-dried residue
CHAPMAN-WOODS, INC.†	Philomath, Oregon	Sawmill, bark-free
CHIPBOARDS PRODUCTS, INC.	Grants Pass, Oregon	Sawmill
CLEAR FIR PRODUCTS, INC.	Springfield, Oregon	Kiln-dried ends, planer ends
COLUMBIA HARDBOARD CO.	Everett, Washington	Chips and shavings
CURTIS CHIPBOARD, INC.	Clinton, Iowa	Millwork residues
DIXIE CHIPBOARD CO.	Rural Hall, N. C.	Cordwood and slabs
HICKORY MFG. CO.†	Hickory, N. C.	Furniture manufacturing residue
JASPER-AMERICAN CORP.	Henderson, Ky.	Raw wood and kiln-dried residue
THE LANE CO., INC.	Altaviste, Va.	Furniture manufacturing residue
LONG-BELL LUMBER CO.	Longview, Wash.	Kiln-dried mill ends
AMERICAN PARBOARD CORP.	Black Mountain, N. C.	Cordwood and slabs
PACIFIC PLYWOOD CO.	Dillard, Oregon	Plywood residues
PACK RIVER LUMBER CO.	Sandpoint, Idaho	Sawmill, bark-free
RODDIS PLYWOOD CO.†	Arcata, Calif.	Bark-free wood residues
SENCORE PRODUCTS, INC.	Fernwood, Miss.	Kiln-dried mill residues
POINSETT LUMBER & MFG. CO.	Pickens, S. C.	Raw wood & furniture manufacturing residue
SWAIN INDUSTRIES, INC.	Seymour, Ind.	Mill residues
THOMASON PLYWOOD CORP.	Fayetteville, N. C.	Veneer cores
U. S. PLYWOOD CORP.	Shasta, Calif.	* Planer shavings and special shavings
VERSATILE PRODUCTS, INC.	Anacortes, Wash.	Sawmill residue
WABASH SCREEN DOOR CO.	Minneapolis, Minn.	Ponderosa pine particles
WEYERHAEUSER TIMBER CO.	North Bend, Oregon	Planer shavings
WILLAMETTE FIBRE & CHIPBOARD CO.	Sweet Home, Oregon	Planer shavings

* 3 ply board

† Initial production scheduled for 1956

(Data from "Wood Particle Board Handbook," North Carolina State College)

Restrictions

Particle board is not a "wonder material" even in its best form. By its fabrication some undesirable features of solid wood are eliminated and some are not; in addition, some undesirable features have been introduced in production of the board.

For example, use of particle board as core stock in veneer furniture eliminates possibility of sunken joints telegraphing to surface of furniture, yet most experts recommend that particle board core stock be cross banded to prevent dimpling of surface of the piece — a defect every bit as objectionable as that caused by sunken glue joints in glued up lumber cores.

In machining, particle board (particularly in the higher resin content board) has been found to be more abrasive than hardwood.

The supply of available residue material should be thoroughly surveyed in advance of any plant construction. In more than one instance a producer has discovered that his available material is not sufficient to produce boards to meet his demand. An excellent idea is to line up the residue products of other wood-working firms in the area as secondary sources of supply.

Survey and Consultation

The value of a thorough, well planned survey of all possible factors involved cannot be overestimated. A fast moving field such as this can change its factors overnight. Right decisions in determining availability of residue material in steady supply, choice of plant process, operational techniques, market demands, prices, etc., must be made.

Timber Engineering Co., research affiliate of NLMA, is staffed with experts in the field who have the equipment and know how to be of invaluable assistance in making pre-construction surveys and in consultation prior to and during production. Considerable information has been accumulated by them. With the completion of the pilot plant now under construction, TECO will assume greater importance in this highly specialized field.

Designers and manufacturers of the equipment required for the various processes described are an excellent source of information and guidance. Resin and adhesive manufacturers can also render valuable service in all phases of particle board manufacture and marketing.

Other Possibilities

Box plants which do not have a sufficient supply of residues in steady volume or deem it unwise to integrate and expand facilities to the extent required for production, can have a definite place in the particle board industry. There is a growing market for wood material in the form of chips or shavings for paper mills and hardboard mills as well as particle board plants.

Equipment for chipping residues to the required size and an efficient plant setup for handling chips in volume would be required as a minimum. For some operations debarking equipment and a system for separating residues by species would be required. Actual requirements will vary radically by areas and, at present, not all sections of the country have strategically located plants capable of purchasing wood residues in volume.

Another factor in particle board production is possibility of production plants being setup to utilize a steady volume of residues in a concentrated area of woodworking activity. In some instances an outside firm may move in to the area for this purpose, or local plants in an area may enter into a cooperative venture and pool available residues required for production.

There are many factors to be considered before entering into an arrangement of the types mentioned. The potential purchaser of the residues in chip form will have definite requirements for the material used. This factor should be thoroughly investigated from standpoint of equipment and facilities required to produce chips to requirements. Delivery arrangements, hauling distance to the user and permanence of arrangement between the user and supplier are of extreme importance, and must be carefully considered. In some instances where plant power is generated by residue burning systems, alternate arrangements are required for sufficient power to operate the plant.

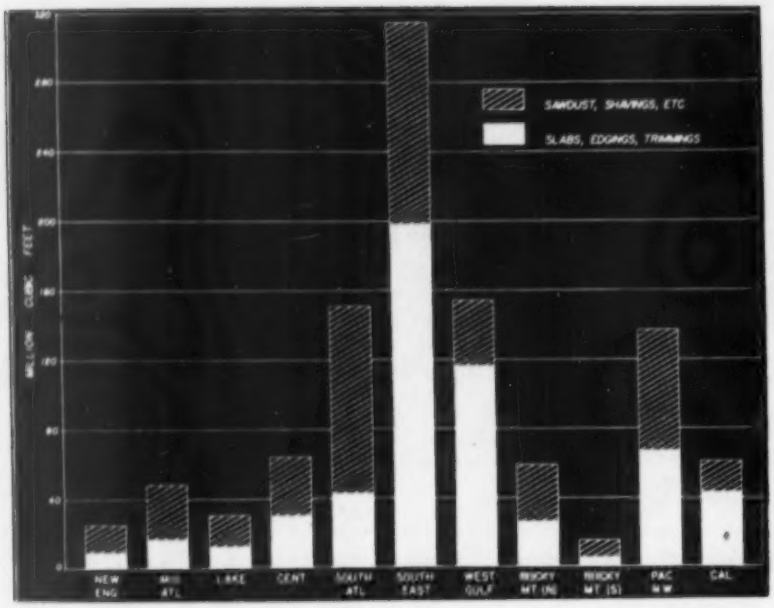
Particle Board in Republic of Germany

By
DR. H. KOOP

NUMBER OF PARTICLE BOARD factories in Germany has increased from about 10 in 1951 to about 40 in 1956. These factories are scattered all over the Federal Republic. Centre of the industry is located in Lower Saxony where about 33 per cent of the total industry is to be found. Factories have varying production capacities. There are large, mechanically well-equipped factories which reach a production of 60 to 80 t. (66 to 88 short tons) or 100 to 130 m.³ (3,532 to 4,591.6 cu. ft.) per day. These large factories all produce three-layer particle boards for the market.

The large factories with a production capacity of 60 to 80 t. (66 to 88 short tons) per day manufacture about 45 per cent of the total production. Fifteen medium sized factories with a daily production of about 40 m.³ (1,412.8 cu. ft.) share 32 per cent of the total production. About ¼ of the boards are produced in smaller factories with production capacity below 40m.³ (1,412.8 cu. ft.) per day.

Verband der deutschen Sperrholz und Spanplattenindustrie e. V. Franz Rucker Allee 19, Frankfurt/Main. Federal Republic of Germany.



PRIMARY MANUFACTURING Wood Residues by Size of Material and Geographic Region. (From "Wood Particle Board Handbook", North Carolina State College, Raleigh, North Carolina.)

Economic Considerations in The Particle Board Industry

By
CARL A. RISHELL

THE RAW MATERIAL SITUATION for particle boards and for other residue utilization processes in the United States is much more complicated than for any of the European countries. The raw material is not only more varied in species but the lumber manufacturing processes and the methods for handling milling residues are not similar throughout the country and frequently are dissimilar within the same region.

Several furniture manufacturers are participants in the particle board industry. It is probably not safe to prophesy that the bulk of the particle board industry will be owned by any specific products manufacturing group. The lumber industry because of its large amount of raw materials, either in the woods or in the form of residue materials at the sawmills, has a considerable interest in the processes.

Some furniture manufacturers are presently engaged in this business, others are studying it. The interest of this group is twofold. First, captive markets are available. Secondly, most large furniture manufacturing plants have raw material available to them from their cut-up plants, veneer plants, etc. Other consuming groups will probably find it profitable to operate particle board plants for their own needs. Manufacturers of counter tops, underlayment for floor coverings, etc., are examples. Lastly, there is a group of independent manufacturers who see in the process the opportunity to develop an entirely new industry which is not dependent upon captive markets nor upon by-products from another industry.

Mr. Rishell is vice president, Timber Engineering Co., Washington, D. C.

The Atlantic States and Appalachian Areas

Throughout eastern United States there is a very great variation in the species of trees available for particle board manufacture. From green material several kinds of particle board can be produced and the system to use, whether it be for an extrusion board, a single layer board, a product made of coarse slivers or a three layer flake type board, will depend upon the markets to be served and several other influencing factors.

Generally speaking, the lumber manufacturer making particle boards will not have a captive market. He must sell his product to a number of consumers. If his market will be with the furniture industry for furniture corestock, he probably will want to first examine the three layer all flake board system. This probably will cost somewhat more to manufacture and the plant equipment will be more expensive, but for many markets the board will have a better appeal than any other kind. A somewhat higher price should be obtained for the product; also, it may have a better sales appeal for a depressed market.

Rough green wood either in the form of slabs and edgings, or as round wood from the forests, is an excellent material for producing flake type board. Also, the principal markets available in this area will probably be in supplying the furniture industry with core stock, but other markets can also be developed.

In some sections of eastern United States there are large furniture producing industries. Larger furniture companies will produce their own particle board to use the residue raw material from cutting-up lumber.

ONLY A FEW FURNITURE manufacturing firms have sufficient furniture production to utilize the product from a medium or large size particle board plant. It is probable that from twenty to fifty per cent of the available market to the furniture manufacturer will be of the captive type, but the remainder will have to be sold on the open market.

The lumber manufacturer should examine several processes. Indications are that a well made three layer all flake particle board can be used for any quality of furniture without crossbanding, whereas other types may require crossbanding. A prospective plant owner must first decide whether the cost of crossbanding offsets the cost of producing a more expensive core. Answers must be obtained by examining the conditions that exist at each plant.

In some instances, utilization of residues regardless of the process chosen will be false economy. An extrusion process has a lower production cost when only kiln dried or thoroughly air dried residual material is available. Other processes available for this kind of raw material is a multiplaten product making use of fine splinters. Strength-wise, without crossbanding, it probably approaches the strength of flake board. When properly sanded, it can be successfully veneered providing a crossband is used. For hidden furniture parts, or for construction materials, it is an excellent product.

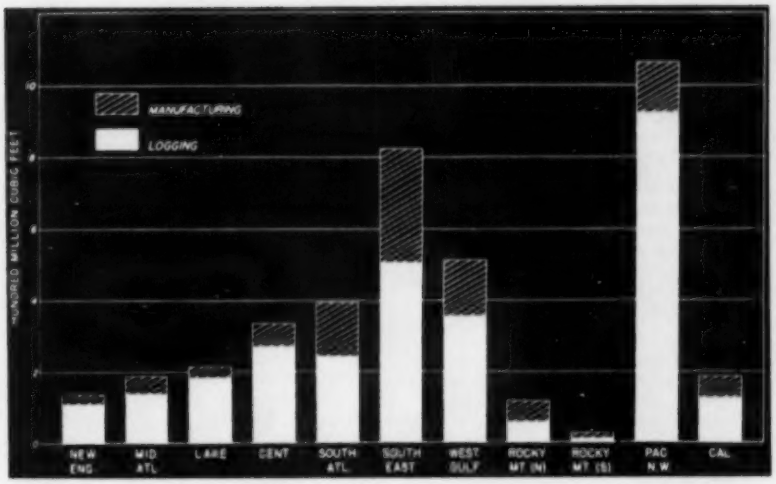
The independent manufacturer not concerned with sawmill operation or actively engaged in furniture production does not have a captive market and the product which he sells will come into competition with all others. Therefore, marketing problems are of first importance and choice of raw materials must be made to fit the product that has greatest sales advantage. If unable to do this, it usually will be the best plan to stay away from the business.

Credit is given to the Food and Agriculture Organization of the United Nations for permission to present these highlights from a paper presented at the International Consultation on Insulation Board, Hardboard and Particle Board, held at Geneva, Switzerland, from January 21 to February 5, 1957.

Middle Western States

With exception of the Lake States, availability of raw materials either in form of slabs and edgings or round wood is much more limited than in other areas. Potential manufacturers in these areas, because of the scarcity of round wood or slabs and edgings, will generally prefer to use one of the splinter board processes rather than the all flake board processes. This area also has an ample market in the furniture industry. Plants can be small and probably a crossbanded material can be made as cheaply as an all flake board product can be manufactured or shipped from other areas into this section.

Choice of raw materials in this area is so limited that those intending to build plants must give careful consideration to the feasibility of manufacturing a crossband splinter board type of product. This may be made either by the extrusion method, or the platen press method.



LOGGING AND MANUFACTURING Wood Residues by Geographic Region. (From "Wood Particle Board Handbook", North Carolina State College, Raleigh, North Carolina.)

Inland Empire

This area is characterized by a large number of soft wood species that are admirably suitable for the production of particle board and here, as in the other areas, the type of raw material available is of the utmost importance in choosing a process. This area is probably more distantly located from the large consuming markets than any other in the United States.

The particle board industry in this region will be integrated with the existing lumber industry. The most economically abundant raw material will be slabs and edgings produced in the manufacture of lumber.

Other influences which govern the selection of a proper process in this area include the large extent of government holding of timber and the influence on timber prices. Another factor is that pulping is not as large as in some of the other timbered areas.

The type of particle board plant which will be most successful is a very large size of operation producing the very highest type of particle board known.

It appears that the process most suitable is a three layer all flake type board of the lowest density that can be utilized in the furniture market.

The type of plant best suited for these conditions should probably produce approximately one hundred tons of board per day and should be mechanized to the greatest extent possible. The larger companies already have existing sales organizations that require little coaching to handle the new product.

Douglas Fir Area

In the Douglas fir area, all lumber is usually planed as it comes from the saw without previously air or kiln drying it. Very little lumber in this area is shipped without planing. On an average for every thousand feet of lumber manufactured, approximately six hunderd to seven hundred pounds of shavings are produced.

It appears that particle board made from shavings is a most desirable outlet for these residues, which have no other large scale economic use. There has been sufficient experience in the manufacture of particle board from shavings to indicate that a very good and readily saleable product can be made from this raw material.

The Douglas fir manufacturer is faced with about the same situation as generally applies in the Inland Empire. However, there is a steadily growing market for furniture corestock in the California area and to a lesser extent in other large cities along the Pacific Coast. These local and semi-local markets will provide an outlet for a part of the manufactured material, but additional markets will be needed. These will be in the Central States or on the East Coast.

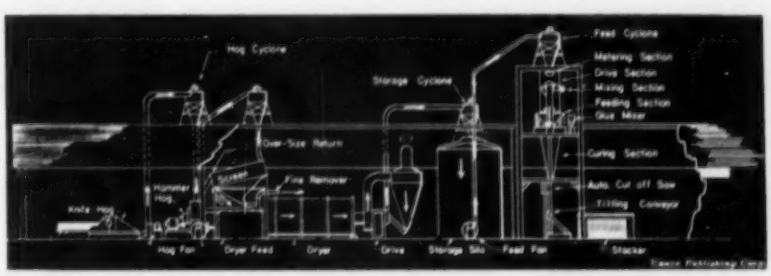
The wage scale on the West Coast is probably the highest of any of the lumber producing areas and this fact must be taken into consideration in deciding upon the raw material and the type of plant to process it. The most successful processes for the Pacific Coast will be those which use shavings as the principal raw material.

West Coast homogeneous shaving boards are finding favor in eastern markets. Ultimate in particle board for furniture is one which can be used without crossbanding. Whether a homogeneous shaving type board can be used for this purpose is not known. However, a board having a core of shavings with flake faces appears to be the best combination for the future.

A board of this type may be somewhat inferior in its properties to that of the three layer all flake type board. For practical purposes this difference should be slight and may possibly be compensated by careful quality control. A successful plant in this region must be relatively large and highly mechanized. The product must have the lowest specific gravity feasible, consistent with other desirable properties.

There is also the possibility of manufacturing an all flake board of three layer construction. To be successful, careful attention must be paid to the source of raw material. Generally speaking, pulp chips, which have a ready sale in the area, are easier to manufacture and command such a good price that suitable raw material will be used for pulping rather than for particle boards.

Problem in this area is producing a board that can be shipped as far as the East Coast and sell at a price which will be competitive with locally produced products.



SCHEMATIC DIAGRAM of Chipcraft Vertical Extrusion Process. (From "Wood Particle Board Handbook", North Carolina State College, Raleigh, North Carolina).

Particle Board Needs Standards

By
WAYNE C. LEWIS

THERE ARE AT PRESENT no recognized standard specifications for particle board. Each company manufactures its product to conform to minimum requirements determined for its raw material, type of product, and process. There is little correlation between products from different manufacturers.

In other instances, purchase specifications have been developed around a particular use. When it has been determined that a certain product with certain strength and physical properties satisfies a given use requirement, minimum test values of the product are incorporated in the purchase specification.

The need for standard specifications is apparent. Such specifications will protect the future of the particle board industry, will assist in obtaining customer acceptance of these new materials, will aid in extending their use, and will give new manufacturers and others a criterion by which to judge their product.

Standard specifications may be developed and promulgated through several organizations.

The Bureau of Foreign and Domestic Commerce of the U. S. Department of Commerce promulgates Commercial Standards. These are originated usually by an industry for the purpose of establishing standard methods of test for evaluating the product, rating of the product, certification and labeling of commodities. They provide uniform bases for fair competition.

THE AMERICAN SOCIETY FOR TESTING Materials has procedures for developing and issuing standard specifications for all materials. Before these standards can get a final vote of acceptance, a majority of the membership of the committee voting must represent general interest and consumer classifications as against producer classifications. ASTM standards as a consequence may carry greater weight in some instances than commercial standards because of the plurality of nonproducer interests.

The American Standards Association also issues "American Standards." An ASA specification is accepted after considerable trial and use. ASTM standards are often accepted by ASA after they have been in use for a considerable time.

Federal specifications are issued by the Commissioner of Federal Supply Services, General Services Administration, for Federal Government procurement. They are purchase specifications for the Government, although in the absence of other specifications they may serve as standards for a material. Federal Specification LLL-H-35, "Hardboard, Fibrous-felted," (fiberboard) is so used.

Industry associations also develop industry standard specifications. Familiar to all in the field of forest products are the "Standard Grading and Dressing Rules" of the West Coast Lumbermen's Association and the standard specifications of the Douglas Fir Plywood Association. Industry standards may ultimately become commercial standards, but initially they have the advantage of time. It is simpler to obtain agreement at the producer level than with groups of mixed interest.

THE AMERICAN SOCIETY FOR TESTING Materials, through its Committee D-7 on Wood, has developed test procedures that are applicable to the evaluation of the strength and physical properties of particle boards. These test procedures are detailed in D1037-56T, "Methods of Test for Evaluating the Properties of Building Fiberboards." Other properties, such as thermal conductivity, fire resistance, and water vapor permeability, which can be evaluated by methods appropriate to materials in general, can be evaluated by other ASTM procedures.

A committee of interested members of the National Woodwork Manufacturers Assoc. did some preliminary work on the development of a commercial standard for particle board. The NWMA sponsored that work as a service to its members and, when the Particle Board Association was organized, dropped the sponsorship because it felt that such a standard was the responsibility of the new organization. The progress made by the committee was summarized in a report issued by the Association.* The test procedures recommended were largely based on those detailed in ASTM D1037.

Trends in Manufacture And Development Will Extend Use

CERTAIN TRENDS ESTABLISHED in manufacture of particle boards can be used to predict development of new uses. Inherent advantages of the boards themselves suggest others. Use of particle board as corestock for veneered and other over-laid furniture will always be a major one for particle board. As corestock it takes the place of lumber and plywood and is preferred because of economy and many better properties. Its uniform surface, its availability in panel sizes free of edge gluing and the attendant problem of sunken joints, and its uniformity of manufacture that keeps it flat are among its principal advantages for that use. Disadvantages are being overcome through better knowledge of how to use the board and through improved particle board products.

In the United States formerly about 500 million square feet of lumber core were required for furniture. Particle board has taken a substantial part of that market. If it could replace all lumber core, other uses would still be needed because of the potential production. The definite swing to manufacture of particle board from engineered particles like flakes or wafers is indicative of its expanding use as panel material. The majority of plants now under construction will manufacture particle boards from flakes or similar particles. Boards from such high-quality particles may well supplement and supplant plywood for many uses. That its strength and physical properties approach those of plywood has been shown experimentally.** Absence of face checking and ability of such panels to stay flat in service even when unsupported will increase their use.

There is also a definite trend toward manufacture of board with phenolic or other resins more durable than urea-formaldehyde. This will extend the use of the boards to exteriors of houses and open up the field of use of particle boards as nailable sheathing in houses. It probably is not too speculative to predict that particle boards, particularly the flat-platen types, will ultimately take their place alongside lumber and plywood as one of our most important wood-base structural materials.

Mr. Lewis is engineer with the U. S. Forest Products Laboratory (maintained at Madison, Wis., in cooperation with the University of Wisconsin). This material is extracted from a talk given by Mr. Lewis at a meeting of the Forest Products Research Society at Berkeley, Calif., May 2-3, 1957.

*National Woodwork Mfrs. Assoc. Recommended Testing Procedures for Wood Particle Board. Available from the Association at 332 So. Michigan Ave., Chicago 4, Ill.

**Turner, H. D. Effect of Particle Size and Shape on Strength and Dimensional Stability of Resin-Bonded Wood Particle Boards. Forest Products Journal, Vol. IV, No. 5, 1954.

Treating Handbook Available

• A new handbook on pressure-treated timber poles, published by American Wood Preservers' Institute, is available for distribution.

Structural properties of poles, utility lines, street and highway lighting and farm and industrial buildings are covered. Data on service life, designs of buildings and recommended preservatives and treatments as well as formulas on figuring working stresses and wind loads along with tables are also covered in detail for the use of engineers, architects and builders.

Particle Boards Offer Utility

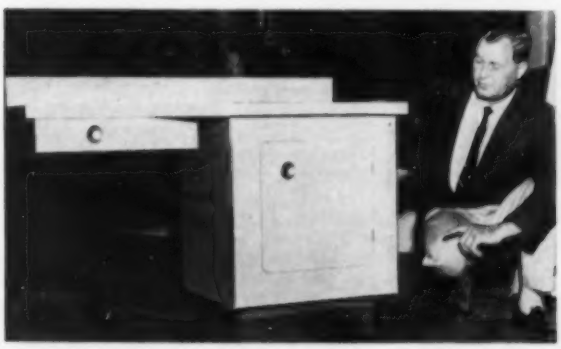
- **Particle and flakeboards find extensive use in furniture manufacture and also as wall and ceiling material.**
- **As furniture core stock, they are overlaid with fine veneers to make high grade cabinets. Table and restaurant counter tops are overlaid with formica or plastics.**
- **The natural beauty of flakeboards, imparted by the grain of various wood species in the surface layer, gives it a special charm for use in interior finishes of playrooms and utility rooms.**

WALL PANELING and facing of cupboard doors are of Novoply, illustrated in above photo, which is a three-ply laminate of impregnated resin wood segments. Novoply board consists of a core of wood chips to which is bonded on either face plys of wood flakes.

PARTICLE BOARD serves as ideal core stock for overlaid table tops, as shown above, and provides easily-cleaned, mar-proof surface.

TENEX waferwood wall cabinets designed by Henry Hill, A.I.A., add luxury look at low cost to this California interior. Fixed TENEX panels and sliding doors above are 2 feet wide. Shelves are adjustable. Philippine mahogany was used for trim and track for sliding doors.

TYPICAL FURNITURE item in which particle board core stock has been overlaid with veneer finish, is chest of drawers, above.



LAVATORY FIXTURE consists of particle board overlaid with plastic material to give the maximum in washability and utility.

FORESTONE ACOUSTICAL tile is furnished in tongue and groove pattern, provides do-it-yourself opportunities in remodeling.

Particle Board Comes of Age

By
C. C. HERITAGE

C. C. HERITAGE

THERE ARE PRESENTLY some 50 to 60 individual particle board plants in the U. S. Although there are no official statistics as yet, the year 1956 probably put out about 250,000,000 sq. ft. based on ¾" thickness and 40 lb./cu. ft. density. For purposes of comparison this would correspond to about 750 million sq. ft. of ½" softboard, 25% of this product's annual production; or to one million sq. ft. of 1/8" hardboard, about 60% of this product's annual production.

Principal questions from a business standpoint five years ago were:

- Whether or not particle board had a sufficiently unique and meritorious use performance to establish itself permanently in the forest products economy of the country.
- Whether or not a simple low capital cost continuous plant could be engineered to be reliable, versatile, readily controlled and easily operated.

It is now a matter of history that both of these were resolved in the affirmative. The technology is practical and the economics sound.

Even so, a major commercial development requires the spark of necessity. This came from the high cost of wood to the producer of consumer goods on the one hand and the high cost of logs to the primary manufacturer on the other. These two added up to particle board from non-utilized residuals.

The amazing growth of the particle board industry arises principally from certain business considerations. The raw material may be of almost any species and of any form large enough to give useful particles. There is, therefore, no problem of wood supply. Plants now extend from New Brunswick to California and Canada to the Gulf. The process is not as complicated as those of most of the older forest products but that does not mean that precise control is any less essential to success.

The process is a dry one, requiring no water and producing no gaseous or liquid effluents. Depending on location, a plant to be economically sound need not be of large capacity. The capital cost per daily ton is substantially below that for the older boards, so the financing involves a sum of money within the resources of many. The plant can be procured as a package with adequate guarantees of performance greatly facilitating construction and initial operation. Finally, the volume and variety of markets and uses both proven and potential are attractive.

A SUCCESSFUL BUSINESS must produce a product of praiseworthy performance at a price in harmony with that performance. But beyond this, the potential consumer must be told about the valuable product so that when he is in the market, he demands it. Then the producer must be prepared to deliver when and where the consumer wants it.

The particle board industry has come a very long way toward these goals. The requirements for each use are now better understood and better met than even a year ago. An Association has been formed to help all members with these most important matters, including reliable reproducible methods of tests so the good performance can be measured and proven. This matter of knowing and meeting requirements of use and proving they have been met will always be a major activity of the industry.

Several years ago market surveys revealed that many potential users had not even heard of particle board. This is rapidly changing because of the increasing number of companies active in merchandising. Because of the wide geographical distribution of plants, the consumer should be pleased with product availability.

Particle board provides a synthetic product approaching closely to lumber itself, giving the consumer a material which is uniform board by board and shipment by shipment, which looks like wood and works like wood, and is available at an attractive price, stable from month to month.

THE FUTURE LOOKS BRIGHT for particle board because of the great variety of products which can be developed to serve an equally great diversity of uses, combined with a wide choice of raw materials. The products already cover a thickness range of 1/8" to perhaps 2" at densities from 60 lbs. down to 20 lbs./cu. ft. At one extreme is a hard thin overlayment, at the other is a thick bulky core material. The product in some plants is hot pressed, in others is continuously extruded, in a third type is continously densified, each exhibiting its own peculiar advantages.

The construction may be homogeneous or layered, the latter, of course, increasing materially the opportunities for product diversification. The composition also may be tailored to the use; the particle size and shape chosen to give the best use performance. The additives for bond and water resistance are presently rather standardized but adequate properties together with lower manufacturing costs for markets as yet principally untouched, call for continuing development work on this phase of board composition.

The particle board industry has arrived. Its future is in the hands of those responsible for giving the consumer an outstanding performance at a price he is willing and pleased to pay.

Mr. Heritage is a Consulting Engineer at Tacoma, Wash.

Hardboard Group Promotes Uses

By
DONALD LINVILLE

DESPITE CONSTANTLY INCREASING imports of hardboard of all types from foreign countries, the domestic hardboard industry maintained its position in 1956.

Hardboard shipments by member companies of the Association closely paralleled the performance in 1955, showing a very slight increase, while imports in 1956 were in excess of 50% over imports in 1955.

According to the latest available information, the hardboard industry in Europe increased hardboard productive capacity by 33%. This increased productive capacity provides the European hardboard industry with an opportunity to greatly increase exports of hardboard to our domestic markets. In view of the world-wide search for dollar credits and the reliance of the European hardboard producers on an export market, this increased capacity poses a continuing threat to our domestic industry.

The Hardboard Association and the member companies continued to aggressively promote the advantages of the use of hardboard in all fields through promotional and educational activities. Of major importance was the development and completion of an educational film, "Out of the Woods", describing the manufacturing processes and the many uses of hardboard. This film has been made available to television stations and will also be available to colleges conducting

Mr. Linville is Executive Secretary, Hardboard Assoc., Chicago, Illinois

wood technological courses.

A new brochure, "Panels of Grainless Wood," has also been completed and is available from the Hardboard Association office.

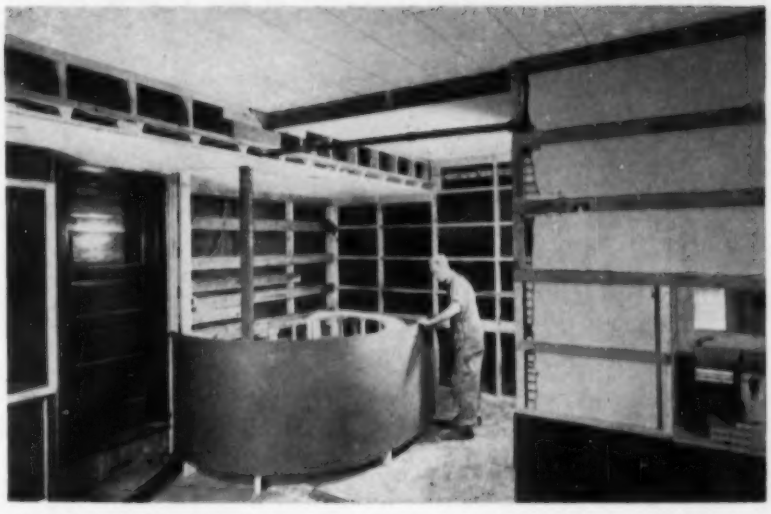
AT THE ANNUAL MEETING of the Hardboard Association held in Chicago, November 7 and 8, the following officers were elected for the new year.

A. VanderSys (vice president, Chapman Manufacturing Company), President; A. J. Watt (general merchandise manager, United States Gypsum Company), Vice President; P. B. Shoemaker (vice-president-sales, Masonite Corp.), Treasurer; J. Tisdall (sales manager, Hardboard Division, Edward Hines Lumber Company), Secretary; R. S. Spangler (assistant to vice president-sales, Masonite Corporation), Assistant Secretary.

The Association plans to increase meetings from two each year to three meetings annually.

Keeping pace with the increased production is a continuing objective of the hardboard industry. A constant effort is being extended by manufacturers to develop new uses and greater adaptability of hardboard to known uses.

The Hardboard Association, in February (1957), launched an intensive promotional program in the 11 Western States, designed to develop more new uses of hardboard in new home construction and remodeling. Four separate projects—three remodeling, and one new home—were completed to increase acceptance for hardboard in home construction. In each case, a leading architect and decorator were chosen to work on the projects, and the finished results are being promoted through publicity and direct mail to all builders and dealers throughout the 11 western states. Further projects of this kind are contemplated, to promote new uses of hardboard nationally and to supplement the promotional efforts of our member companies.



HARDBOARD IS WELL SUITED for home improvement jobs. Here, sheet of standard ⅛-inch hardboard is being bent around a framework to form a bar; lower right, it is used for wainscoting, will be used for light valance above bar, and to make old panel door modern,, flush door. (Hedrich-Blessing Photo)

Forest Products Lab Reports

By
J. A. HALL

IN RECENT RESEARCH on wet-formed hardboards, the U. S. Forest Products Laboratory has succeeded in producing excellent quality board using whole wood fiber made from raw wood chips. This whole wood fiber was produced by subjecting green or presoaked chips to a shearing and crushing action, such as imparted by repeated passage through metal squeeze rolls. This coarse fiber is further refined in disk mills to prepare it for boardmaking. The resultant fibers and fiber bundles are flexible and pulp-like in character and very free with respect to water drainage.

Such fiber used by itself would yield boards substandard in strength and water resistance, but the proper use of resin additives and heat treatment can compensate for these deficiencies. A substantial increase in strength resulted from the addition of one percent of a beater additive type of phenolic resin. The boards made from a mixture of whole wood fiber and resin lack water resistance, however. Perhaps this can be attributed to the high hemicellulose content of raw wood fiber, lack of activation of the lignin, and the absence of any water repellent in the board. Experiments showed that the water absorption could be greatly reduced by heat treating the board at, for example, 165° C. for about three hours.

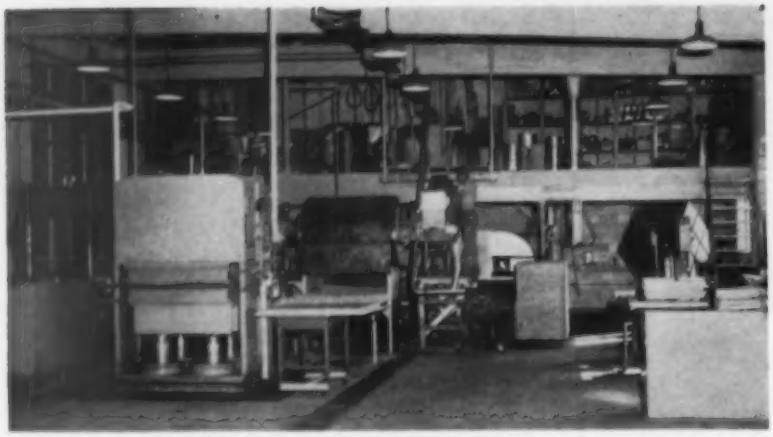
By means of this combination of treatments, it is believed that good quality S2S board can be made from raw wood fiber. The process should also be suitable for the production of a variety of semihardboards from raw wood fiber. Whole wood fiber of this type would probably also be suitable for the coarse fiber component of insulating board.

This process developed by the U. S. Forest Products Laboratory is advantageous because (1) raw wood fiber can be used for quality boards with the resultant benefit of high yields, and (2) stream pollution should be minimized because no chemical wood cooking is involved.

The Laboratory has no published reports on this process ready for distribution at the present time, but Laboratory specialists will discuss the process with interested parties at Laboratory offices in Madison, Wis.

OREGONBORD'S NEW RIPPLE pattern hardboard, "Surfa-Tex," is new, is offered in both tempered and standard finish. Ripple pattern is molded into surface with screen side being flat for easy application with either nails or adhesives. Two thicknesses are available: ¼" and ⅛". "Surfa-Tex" is manufactured by Chapman Manufacturing Co., Corvallis, Ore.

Mr. Hall is Director, Forest Products Laboratory, Forest Service, U. S. Dept. of Agriculture. The Laboratory is maintained at Madison, Wis., in cooperation with the Univ. of Wisconsin



VIEW OF PORTION of Wood Technology Laboratory, Washington State Institute of Technology. Included in photograph is a press, universal felting machine, rotary dryer and batch type mixer.

Institute Reports Progress

By
DAVID C. FLEHARTY

MAJOR 1956 DEVELOPMENTS in composition board research at the Washington State Institute of Technology were the following:

- Study of particle board strength as affected by variations in resin content, wax content and specific gravity.
- Investigation of the effect of species or particle board properties.
- An improved permeability test for insulation board.
- A universal felting machine.
- A new type dryer for laboratory use.
- Improved testing procedure for hard board strength.

Resin, Wax and Specific Gravity Variables

Objective of this research was to study the strength response of two screen fractions of green Douglas fir planer shavings to three production variables in particle board manufacture. The production variable were resin content, (dry powdered phenol), wax content (liquid emulsion), and specific gravity.

A secondary objective was to determine the effectiveness of internal bond strength measurements as contrasted to modulus of rupture in studying the relationship of these processing variables.

These conclusions may be drawn from the results of this study:

- Coarse screen fraction yielded higher modulus of rupture values than the fine fraction at all levels of resin and wax content.
- When compared by the results of the internal bond test, the reverse was generally true, the fine fraction giving the higher strength.
- The addition of 0.75 per cent wax had a beneficial effect on both strength properties under all conditions of resin level, specific gravity, and screen fraction. In some cases, the effect of the wax exceeded the effect of resin in contributing strength to the board. This was particularly true with the coarse screen fraction of two per cent resin content.
- The effect of resin followed the usual pattern of increase in both strength properties, but there was evidence of decreased resin efficiency with the eight per cent resin content.
- The internal bond test was found to be a worthwhile adjunct to the modulus of rupture test in interpreting the observed results.

The results obtained in this study are being prepared for publication in an Institute bulletin. This study has also led to a more comprehensive research project on the inter-relationships of wax additives with other variables in particle board manufacture. This latter project is being sponsored by the Hercules Powder Company. Results of this study when completed will also be published by the Institute.

Effect of Species on Particle Board Properties

Use of mixed species in a particle board operation is more complicated than when dealing with only one species. The problems are intensified if wide differences exist between the basic properties of the individual species, and if the proportion of the different species in the mixture is variable.

The primary purpose of this investigation for an Inland Empire mill was to study the effect of wood species on the physical properties of homogeneous particle boards and three-layer particle boards. The study was limited to dry planer shavings of spruce, white fir, ponderosa pine, lodgepole pine and Douglas fir-larch.

Some of the irregular effects of species have been traced to variations in particle size and shape within the screen classifications used in the experiment. These, in turn, may be related to species and their response to the planning operation. It is hoped that this and other investigations along this line will lead to a greatly simplified control system to regulate the quality of boards produced from a supply of material which is variable in species content.

Permeability of Insulation Board

Present trends in building construction are such that insulation boards are exposed to humidity conditions more severe than they formerly were. It has become important to have reliable information relative to the rate at which the moisture vapor will pass through building construction materials, to know what can be expected of a given material, and to be able to establish standards of construction. Dale Ziegler, Institute wood technologist, in cooperation with a TAPPI subcommittee, has developed an improved moisture vapor transmission tester. This apparatus tests a 12 inch square sample which is bolted rigidly in place. This prevents warping which would break the edge seals. Accuracy of 0.0001 grams of transmitted moisture can be achieved.

Universal Felter

The felting machine is generally one of the least versatile pieces of equipment in most composition board plants. Most other equipment can process more than one type of particle for various types of board, but felting machines are generally restricted in their capabilities. A universal board forming machine which will felt boards from most any type of material has been developed by the Wood Technology Section from a basic design of Frank R. Smith of the Sylvanal Corporation at Longview, Washington.

A mat 50 inches wide is formed on a continuous basis using flakes, shreds, particles, or fibres. The machine consists of a metering belt which deposits material on another belt running lengthwise along the axis of the felting head. The felting head is a rotating screen drum that deposits a mat on moving cauls below by a snowing action. Screen mesh sizes are interchangeable depending on the type of particle to be fed.

Laboratory Dryer

Control over moisture content is vital to the production of experimental composition boards. Open air racks and ovens in which the particles are dried in trays are relatively inefficient.

This problem led to the design of a rotary-type dryer for laboratory use.

Mr. Fleharty is Technical Editor, Institute of Technology, Washington State College, Pullman, Wash.

Chemicals Aid Board Industry

By
JOHN M. HINE

PHOTOGRAPH ABOVE shows pressing section of hardboard laboratory.

THE COMPOSITION BOARD INDUSTRY is a rapidly growing young industry. From only two producing plants just ten years ago there now are an estimated 59 in 1956, with several more in the construction or planning stages. The chemical industry has been an important contributor to this tremendous growth through continuing research programs on new and better products for the board industry.

Although the first product in this field, Masonite was successfully made for many years without the use of auxiliary binders and chemicals, newer processes and products have been highly dependent on the use of chemical products to produce the required properties in the boards. Among these properties are strength, appearance, workability, dimensional stability, nail and screw holding ability, abrasion resistance, and moisture resistance.

They are obtained by using binding materials, which are generally synthetic resins; sizing agents; tempering oils; alum; acid; and small amounts of various other chemicals. On a board weight percentage basis, the use of all of these chemicals is small, but the actual volume is quite large. Their importance to the qualities of the boards in which they are used is very great.

Neglecting soft boards, there are two main classes of composition board, hardboard and particle board. Hardboard may be further classified by the type of manufacturing process as wet process, semi-dry, or dry process. Particle board is sub-divided into several types including true particle board, flake board, shaving board and splinter board.

BINDERS USED in all types of hardboard are almost exclusively synthetic phenol-formaldehyde resins which have been specifically developed for each process. Highly effective and efficient resins have been developed which impart the desired properties to the hardboards with a minimum of resin usage. This amounts to as little as ¾ of 1% for some wet process boards with a maximum of 3% for some dry process boards.

Resins used in hardboard are almost always manufactured and used as aqueous solutions, with resin contents at time of delivery ranging from 25 to 50%. Because of this, any accurate estimate of usage on a liquid basis is very difficult to make. However, the industry has an annual resin solids consumption capacity of between 2500 and 3000 tons, based on published plant production capacities.

Some special types of particle boards are also made with phenolic resin binders, but a high percentage of the total production is made with urea-formaldehyde resins.

During the early stages of this development, wood adhesive resins, which customarily incorporated wheat flour extensions and acid setting catalysts, were adapted to the new use. Solids requirements were high with these products, the extensions and catalysts made them expensive, and they had the serious disadvantage of emitting quantities of formaldehyde fumes at the press and from the finished board.

CONCERTED EFFORTS by the resin manufacturers and particle board plants have now eliminated many of these disadvantages. Improvements in the resins particles, and manufacturing processes have all helped make possible a reduction in resin requirements to three to six per cent, the elimination of extenders and catalysts in most cases, and the reduction of formaldehyde fumes at the press and in the board to a negligible quantity.

Although some powdered resins are used in particle board, most of the resin is supplied as an aqueous dispersion with solids contents generally in the range of 60 to 65%.

The published production capacities for the particle board field indicate that there is a market for 15,000 to 17,000 tons of urea resin solids and about 2,000 tons of phenolic resin solids.

Resin binders give the boards many of their necessary properties, but do not give much resistance to moisture absorption. This property must be obtained from sizing agents, such as paraffin wax emulsions and petrola-

(*Continued on page* 147)

E. H. HELLER, wood techonolgist, tests a hardboard specimen in hardboard test laboratory.

Mr. Hine is West Coast Development Manager, The Borden Company, Chemical Division

Automation Keynotes New Plant

By
DALE L. SCHUBERT

THAT AUTOMATION HAS A PLACE in the wood products industry is proved by the plant of the Columbia Hardboard Co. at Everett, Wash. (described in this issue). It produces hardboard with scarcely the aid of a single human muscle.

Engineers of the Industrial Development Company of Tacoma, Washington, designers of this plant, and about ten others look upon it as a pioneering effort.

Completely actuated by a complex of electro-hydraulic controls, it produces hardboard in perfect and mathematically prescribed syncronization. Using almost two thousand horsepower, this factory is one of the most highly automated operations of any sort in the Northwest, an answer to higher production costs.

The Industrial Development Company started its growth when the composition board industry was in its infancy and dedicated itself to the design of automated panel board plants. Its engineers have designed automatic machinery for all aspects of the industry. But still this was not automation at the level to which they felt the industry could be brought. They now have in operation entire factories working as a single automated machine. In Columbia Hardboard's plant the engineers planned the sort of wood processing plant they knew could be designed.

ECONOMIC CONSIDERATIONS of hardboard manufacture have been primarily responsible for automation of the plants. Consider, for instance, the output of what is generally taken to be a small sized plant. Boards 4 feet by 8 feet by ¼ inch thick will have to be made at the rate of approximately 50 to 100 per hour. Consistent and unfaltering operation of the components of a plant by humans at such a rate is out of the question. The job would be impossible in some of the present day plants which are geared to produce boards at the rate of one every 15 seconds.

The hot press is the focal point of a board plant and can logically be a starting point for automatic operation. Generally the hot press will have 10 or more opening for compressing and curing the raw board. Application of several different pressures for differing times are automatically controlled, not so much because the times are so short, but in the interests of product quality and uniformity.

The press loader takes a mat into every other opening when descending and fills the remaining opening while ascending. By the time the loader is filled the press cycle has been completed and the boards have been discharged into the unloader.

When the final opening of the loader has been filled, all of the mats are pushed into the press with, in some cases, the first mat of a new load closely following the load going into the press.

AHEAD OF THE LOADER the mat is formed continuously by a felter. In the usual hardboard plant the mat is pre-pressed continuously, and then sawed into suitable lengths by a so-called flying saw which moves both with and across the mat to obtain a square-cut of the mat.

It is generally considered much safer to use a "cascaded" automatic control system, particularly when caul plates are involved, rather than a system operated on a time base. In a cascade system limit switches are so connected that one operation must be completed before a subsequent operation can be performed.

Insofar as the felter, pre-press, and cut-off saw are concerned, these are continuous operations and therefore need no sequencing control. Saw movements are driven from the same drive that drives the conveyor belt and therefore becomes a function of the conveyor belt speed. Position of the saw with relation to the mat triggers the vacuum pick-up to place the mat on a caul.

The vacuum pick-up having completed its operation, signals the combined mat and caul conveyor to carry them on to subsequent operations. As soon as the caul clears the pick-up station a new caul is introduced to receive the forthcoming mat.

AUTOMATION REQUIRES SAFETY interlocks between succeeding units of the system. The interlock system can become quite unwieldly if restrained judgment is not used in its design. The interlock system should be primarily for the protection of personnel, or prevention of serious damage to a machine. In order that a plant not have an unduly complex electrical system it must be assumed that the plant operators will be able to stop the machine in the event of a serious malfunction.

Ahead of the mat forming machine is a complex system of metering devices, additive mixers and meters, material dryers, screeners, shavers, and many interconnecting conveyors. The control and sequencing of these units makes considerable use of instruments.

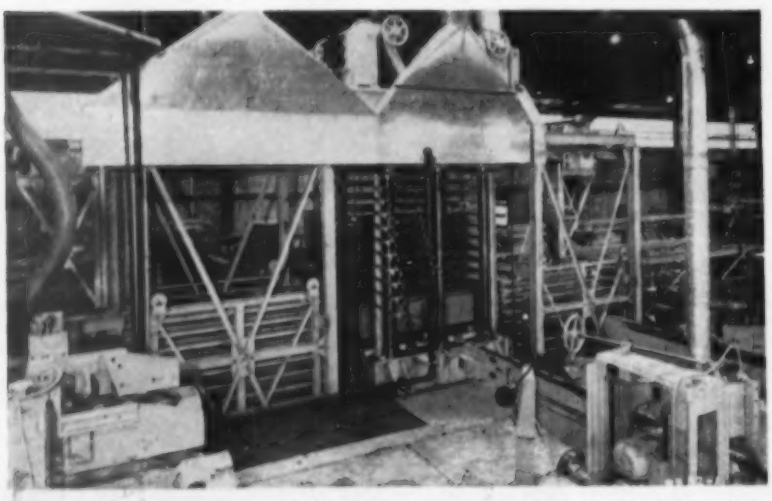
Working backwards in logical groups from the mat forming unit is first a group comprising a mixer to mix resin with the shavings, a weighing scale, plate feeder, and the resin metering pumps. The scale is instructed by the operator to deliver a definite weight per minute to the forming machine. The scale does this with air instruments by controlling the speed of the plate feeder to vary its output. At the same time that the output of the plate feeder may be varying, the scale also varies the output of the resin pumps to maintain the correct percentage of the resin mix.

Drying of the material precedes the mixing with resin. Generally in particle board and flakeboard plants drying is done in a direct-fired rotary kiln dryer. The in-put temperature to the kiln is a function of the output temperature and is adjusted to get the desired moisture content of the material. Additionally the input temperature is affected by the weight of material passing over a scale in the conveyor feeding the dryer.

THE OUTPUT SIGNAL OF THIS scale is additionally modified by the

(*Continued on page* 140)

Mr. Schubert is manager of Industrial Development Company, Tacoma, Wash.



WASHINGTON IRON WORKS (from Left) unloader, press and loader at Columbia Hardboard Co.

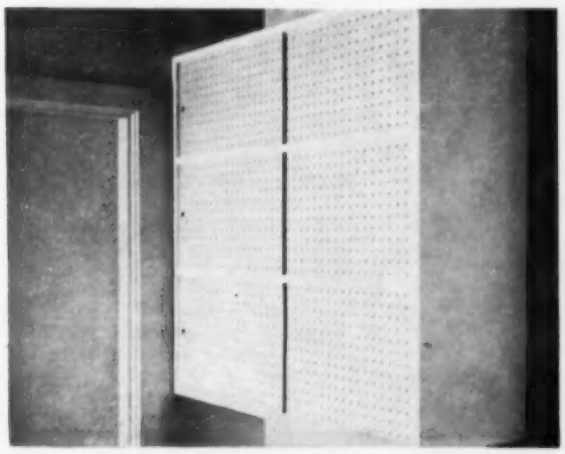
Hardboard Finds Many Uses

HARDBOARD SIDING, one of most recent developments in industry, currently accounts for large volume of this product annually. It is tempered, withstands weather indefinitely.

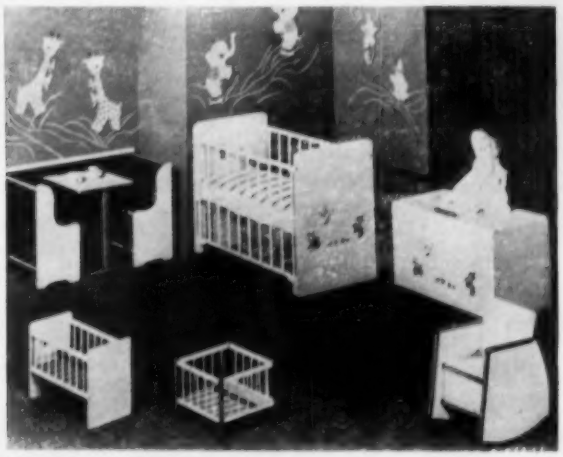
- **Hardboard is versatile. It serves as a building material and has many uses in furniture, as well as industrial applications.**
- **In building, hardboard is a convenient hard finished panel, available in 4x8 foot sheets, that can be worked with ordinary carpenter tools and is easily nailed in place. It can be bent or molded.**
- **Hardboards now come in a wide variety of finishes. The smooth, glossy surface is highly paintable, lends itself to easy maintenance.**
- **Hardboard can be used as interior or exterior finish. It can be applied on ceilings or on walls.**
- **In furniture, hardboard serves as drawer bottoms and backs, cabinet backs, molded radio set parts and has many other uses.**

RANDOM-PLANK pattern hardboard paneling, made by Forest Fiber Products Co., is designed to provide attractive vertical-line wall finish. These panels have shiplapped edges, the grooves spaced for 16-in center applications. Three of company's hardboards, Thriftwood, Sandalwood and Chestnut Brown (both temper-treated) are available in random-plank pattern.

SQUARE-TEX PV (Canadian Forest Products Ltd.) hardboard and Plank Board (right) provide an attractive interior finished for this receptionists office, shown in above photo.



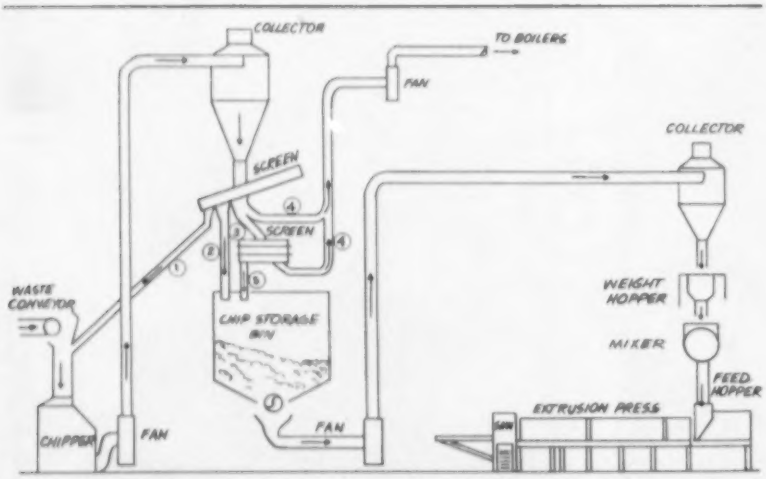
ONE OF a wide variety of perforated hardboards, useful in cabinets, home workshops, playrooms. It holds objects on hooks.



HERE'S HOW some of hardboard is used in furniture. It's hard, smooth surface provides ideal material for children's rooms.

LANEWOOD EXTRUSION press at The Lane Company, Altavista, Virginia, has been in operation for three years. Cost of the press and all auxiliary equipment is approximately $137,000. Rated production on three shift basis is 6,500,000 square feet of 13/16-in board costing about $55 per thousand feet. Press is made by Adamson United Company of Akron, Ohio. Seven other Lanewood presses are now in operation manufacturing furniture corestock.

Lanewood - An Extrusion Process for Particle Board



SCHEMATIC LAYOUT of equipment in Lanewood particle board process. (1) Oversize chips to the chipper; (2) usable chips; (3) fines to screen; (4) fines to boiler; (5) usable fines.

EXPERIENCE GAINED in developing and operating a pilot extrusion press from August 1952 enabled The Lane Company in 1953 to design a press capable of producing some 110,000 - 115,000 feet of ¾-in. board per 120 hour week.

This press, designed by engineers of The Lane Company, Inc., and Adamson United Co., Akron, Ohio, is manufactured and sold by Adamson United Co.

In the past few months seven additional installations have been made and are performing very satisfactorily. A number of others are under construction.

The Lanewood process is a continuous extrusion process and produces chipboard at roughly two-thirds the cost of the hot press process and with about one-half the capital investment.

Residuals in all sizes and shapes and species, dried to about 10% moisture content as it would naturally be in a woodworking plant, is delivered to a chipper or "hog" which breaks it up into small particles. Output of the hog goes through a selective screening whereby over-size particles are returned to the chipper and the small particles and dust are discarded to be otherwise disposed of.

Usable chips are automatically weighed out in batches and mixed with liquid resin glue which is sprayed into them in a tumbler type of mixer. The mixture of resin and chips which is still in a fairly dry condition is then dumped into the hopper of the press which feeds them into the press proper. A reciprocating ram drives the mixture through a flat passage between steam heated plates under pressure where they are simultaneously cured and compressed into a board of about the same density as medium density wood.

The board which can be up to four feet wide and up to 1-½ inches thick, emerges from the rear end of the press in a continuous ribbon and is cut off in lengths as desired by an automatic travelling saw. The basic piece of equipment in the process is the extrusion press and saw.

The material can be:

- Routed, shaped, moulded, etc., in the same way as lumber.
- Veneered with face veneer, back veneers, and crossbands, and produce a surface capable of taking a high grade finish.
- Costs are much lower than under the multi-platen process.
- Less floor space is required.
- More uniform thickness.
- No trim waste because trimming is not required due to hard uniform edges.
- Less planer and saw pick outs because of more vertical alignment of chips.
- High screwholding power in all surfaces as compared to low screw-holding power in edge of multi-platen boards.

(*Continued on page* 140)

PLIMBERITE ¾-in. boards in the standard size 8 x 4-ft. were used for decking flat roof of new Radio Research Station at Datchet. Photograph shows a part of the 45,000 square foot roof under construction. Covered with three layers of bituminous felt, ½-in. **PLIMBERITE** was also used for covering in the roof heating ducts, over the timber stud framework.

Britain's Board Mills Study Trends to Boost Capacity

By
T. B. DODSON

General Manager,
British Plimber Ltd.,
London, England

Returns issued recently by the Board of Trade show the production of particle board in the United Kingdom during 1956 as 25,284 tons. This is considerably under the full capacity of the mills, and is accounted for by the depressing effect on sales of the government's credit squeeze in the earlier part of the year and to some quite extensive planned shut-downs, to improve quality and capacity.

The current year has, however, got away to a good start and the particle board mills are working to capacity to meet the renewed demand from the building and joinery trades, and also the very definite interest in particle boards now being shown by furniture manufacturers.

That general acceptance of particle board by the furniture industry is imminent, is obvious by the interest of the distributive trade especially those merchants currently handling furniture grades of plywood and blockboard. In the building and joinery fields, too, extensive development is forecast. The particle board producers are studying these requirements very closely both individually and through the newly formed British Wood Chipboard Manufacturers' Association, representing the industry in the United Kingdom.

Particle board—or wood chipboard as it is called in the United Kingdom—started here as a building material and looks like continuing to remain so in a big way. For instance, one producer makes a specially prepared type for use as shuttering (formwork) for concrete, whose performance, strength, size of sheet and particularly price, have found much favour amongst contractors. The call from joinery and shopfitting trades for ready veneered boards also is on the increase.

Work proceeds at the new plant at Rainham, Essex, for British Plimber Limited, and most of the main parts of the production line are on site and are being installed. When this comes into action later in the year the productive capacity of particle board in the United Kingdom will be about 90 million square feet or some 70,000 tons.

• Because it is easy to use with ordinary tools, lumber ranked high among the purchases of do-it-yourself fans. Each person doing his own building, says the Small Business Administration, bought $60 worth of lumber in the past year. Retail lumber yards cater to this type of customer, have on hand quantities of Douglas fir, western red cedar and west coast hemlock for his selection in most grades, widths and lengths.

HANGAR FLOORING using ¾-in. **PLIMBERITE** is laid over joists at 16-in. centers. The surface is filled with "Firston" Chipboard Filler and sealed with Bourne Floor Seal G. 131.

U. S. Imports of Board Products * (in 1,000 lbs. units)

* Data from Extracts From Report No. FT-110 **United States Imports of Merchandise for Consumption.** ** U.S. Dept. of Commerce, Bureau of Census commodities classifications: [1]/ 4740 110; [2]/ 4740 120; [3]/ 4740 160; [4]/ 4740 190 (which formerly included commodities listed under specs. 4740 195 & 4740 199 subsequent to 1953; [5]/ 4740 195; [6]/ 4740 199.

** Year	[1]/Insulating Board	[2]/Wallboard NES Not Laminated	[3]/Fiberboard NES	[4]/Pulpboard-Paperboard Finished	[5]/Hardboard Plate Finished	[6]/Paperboard NES Finished (includes several types of wallboards)
1943	3,191	85	1	2,765		
44	5,930	40	55	1,630		
45	2,344	48		2,744		
46	1,373	9	168	4,671		
47	2,446	859	120	3,600		
48	146	760	321	3,233		
49	22	533	527	23,493		
50	4,872	4,215	1,767	26,654		
51	6,071	12,961	2,350	53,646		
52	7,648	1,581	1,202	24,268		
53	8,061	4,116	2,429	48,193		
54	7,412	782	2,307		49,873	14,758
55	15,036	2,860	1,693		79,361	176,579
56	21,350	6,186	988		116,811	59,377

AERIAL VIEW of Columbia Hardbord Company plant located at Everett, Washington, which manufactures new flakeboard product. The buildings shown in the picture are: No. 1, scow grid and the craneway area; No. 2, wood yard; No. 3, shaver building; No. 4, silos; No. 5, dryer house; No. 6, main building; No. 7, boiler house; No. 8, machine shop; No. 9, office of hardboard plant.

Automatic Plant Produces Cedar-Alder Flakeboard

Columbia Hardbord Co. at Everett, Wash. opens a new plant and initiates another pattern of wood utilization.

Why They Built The Plant

THERE'S A NEW NAME in the rapidly progressing, magic world of wood products. It's Cedawood—a flakeboard compounded of cedar and alder—manufactured at the new Columbia Hardbord Co. Inc., plant, Everett, Washington.

This new plant, now producing 60,000 sq. ft. per day (½" basis) by means of highly efficient automatic machines came about through the foresight of Fred Johnson (owner of Columbia Veneer, Inc., Kalama, Wash.) and the design talent of Dale Schubert, and his staff of Industrial Development Co., Tacoma, Wash.

Mr. Johnson as a plywood producer has watched the cost of peeler logs rise steadily. In addition he has seen labor and production costs increase. In the face of these realities, Mr. Johnson, together with other industry leaders, has turned to the development of new fields of wood utilization.

Don Johnson, sales manager of Columbia Hardbord and sales-wise son of the president, contributed the final, compelling reasons for the new enterprise. Knowing the strong acceptance of composition boards in the consumer and industrial markets of the nation, he reasoned that the new board would be a natural sales supplement to plywood being produced at the company's plywood and veneer

Versatile Plant Features New Ideas in Manufacturing

The Columbia Hardbord Co. plant has three unique characteristics:

• Manufacturing facilities are practically automatic, requiring only 10 to 13 men per shift to handle the production line, including the warehousing and woodyard details. Most of the mechanisms are actuated hydraulically and by means of electric drives and gear motors.

• It is the only plant in the nation now producing ⅛" to 1"-thick flakeboard with wood flakes throughout the thickness of the board.

• It is set up to manufacture flakeboard in three layers—that is, with the core of the board made up of flaked fibers and with top and bottom surfaces of the board covered with fines. Columbia Hardbord is not currently producing this type of board, but the manufacture could be routine at any time if the market demanded this type of product.

OVERALL VIEW of the board manufacturing process. Flow here is from right to left. The major sections shown here are (1) Star Iron Works pre-press which is operated by Vickers hydraulic system, (2) Washington Iron Works 10-opening hot press and Oilgear unit and (3) finishing department. The accessories include Link-Belt transmission equipment, Micro Switches, U. S. electric motors and Eberhardt-Denver speed reducers. The duct work in this board plant was installed by Archer Blower & Pipe Company.

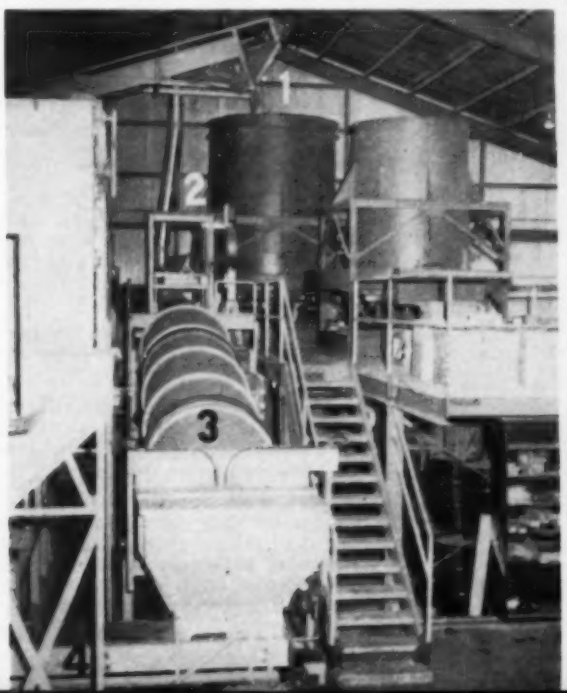
plant at Kalama. Mixed car shipments of board and plywood, he argued, would be important offerings to the market.

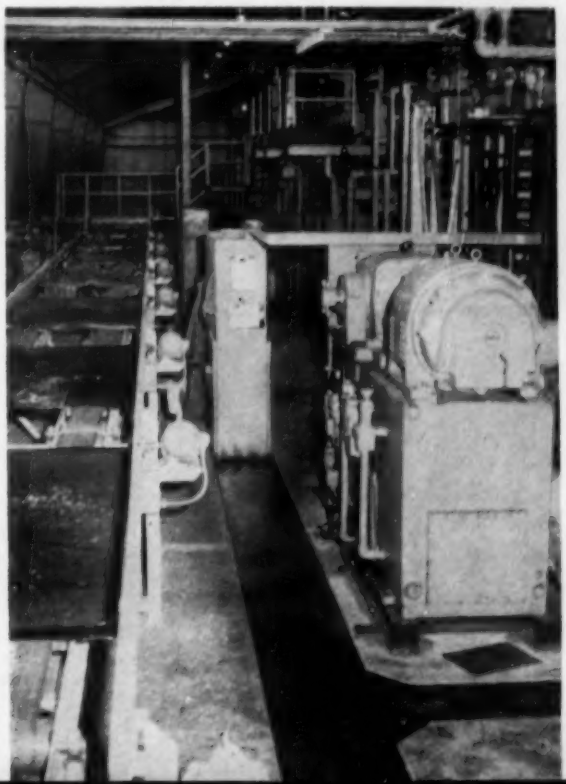
So it was:

- the need for greater raw material utilization (to offset rising costs)
- sound sales judgment that brought into actuality the new flakeboard plant at Everett.

The automatic plant was engineered as a package unit by Dale Schubert's engineers. The plant site at Everett was selected because of the proximity of an ample supply of leftover cedar, in the form of bark-free slabs. Currently the supply is barged from the Seattle Cedar Lumber Co. in Seattle to Everett. Other cedar mills in the Everett area also are supplying mill residue.

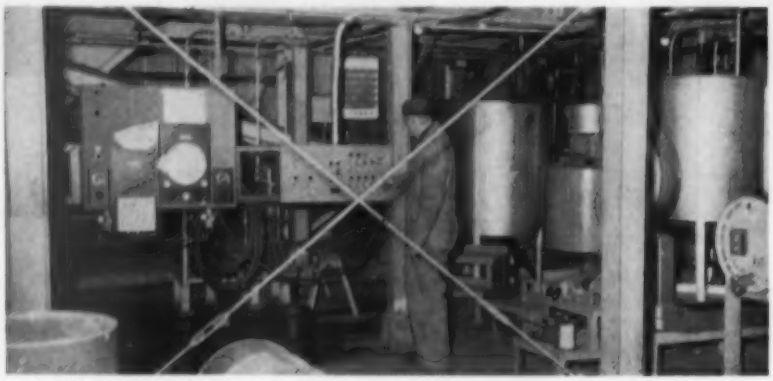
PHOTO BELOW, flow of flakes entering main plant building begins with conveyor which drops material into tank (No. 1). The flakes are fed from tank to belt passing over Toledo scale (No. 2). Additives are proportioned into revolving mixing cylinder (No. 3) which mixes resins, water and wax with dry flakes. As flakes emerge from cylinder, they go to belt conveyor (No. 4), are ready for entry into feeding mechanism ahead of forming machines. Right photo: view of back side of board-making machine and presses and long caul return at left. Polished steel plates are returned to mat-forming section for subsequent batch of panels. Right foreground, Oilgear hydraulic unit powered by U. S. electric motor. Micro Switches play an important part in the cycle of board production, particularly in the pressing phase.





Highlights of Cedawood Production at Columbia Hardbord

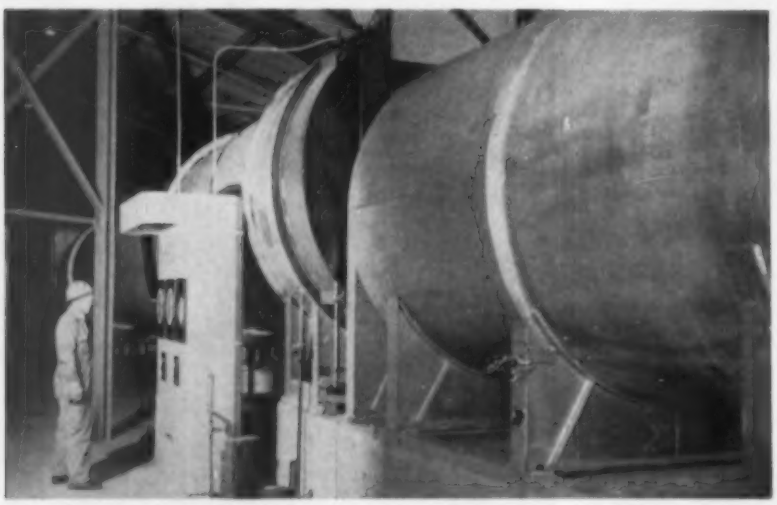
GREENLEE BROTHERS skinner saw unit at left cuts board to 48 inches in width. Final trim to 96" length is done by Greenlee trimmer saw, right. All finishing machines are automatic.



MIXING CENTER prepares additives automatically. Operator controls volumes of water, wax and resin by push buttons on control panel. Vats, right background, were supplied by Eastern Industries Inc. and Black Bros.; American Marietta, resins; Hercules Powder Co., Paracol wax.

Cedawood Combines Two Species

Cedawood is 60% cedar, while 40% comes from alder, which is purchased in short log form and trucked to mill site by farmers in the region. Mixture of these two species produces board with excellent strength properties, attractive appearance, low water absorption.



FLAKES ARE reduced in moisture content in a large, revolving dryer which is housed in a separate building. The heat is provided by an oil-fired Johnson Burner, shown at right. The dryer operator checks the control instruments, which were supplied by Minneapolis Honeywell.

Material Flow Features Many Automatic Controls

FIRST, CEDAR SLABS and alder logs are sawn into two-foot lengths. In this size they are delivered to the "flake house".

Fibers from the flake house are fed (by conveyor) to steel storage silos, where the alder and cedar are thoroughly mixed. Via rubber conveyor they go to the dryer building, where a huge steel drum, heated internally by a Johnson oil-fired furnace, handles 100 lbs. of fibers per minute. The drum revolves continuously and the fibers, after being dried for from three to four minutes, are discharged by conveyor to the main manufacturing building.

Terminus of this conveyor is the flake storage bins, which constitute the first stage in the actual manufacturing process. From these bins flakes are measured past a special scale into a large, oblong mixing tank. This mixture including the addition of resin, wax and water passes into a surge bin; next, the flakes emerge by rubber conveyor into the board forming machine.

Research and Personnel

Quality control and research are being carried on constantly by the Columbia Hardbord laboratory under direction of Wyman Williams. In this well-equipped lab, the new Cedawood board is tested for abrasion resistance, strength qualities, water resistance, moisture content, screw holding, abrasive resistance, and other physical properties.

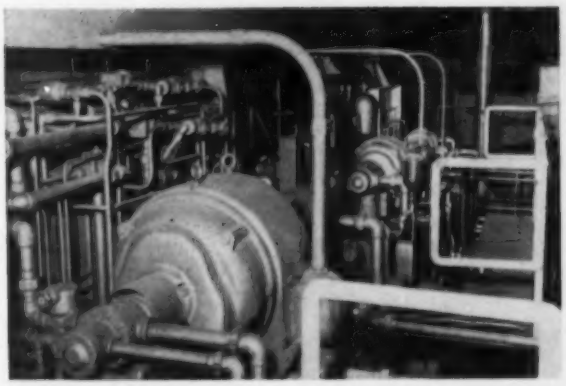
Officers and operating personnel of Columbia Hardbord are: Fred Johnson, president; Don Johnson, secretary - treasurer; Dale Schubert, vice president and manager; J. E. Mickler, superintendent.

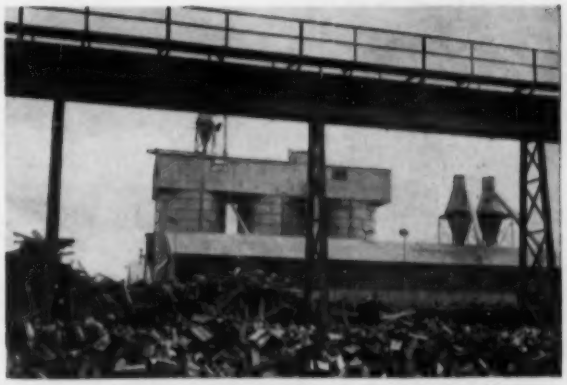
This first phase of the production line is completed when the all-steel cauls are introduced automatically and the fibers fall into place in the required thickness for whatever type of board is being made (¼", ¾" or 1").

The cauls then move automatically forward toward **phase number two** in the production line—the pre-press. This large steel housing has two important functions:

- by means of automatic elevators cauls are fed into two levels for the charger,
- an automatic flying cut-off saw trims each end of the board, the refuse from which falls onto scavenger conveyors to be returned to the surge bin.

This trimming process is now as a part of the pre-press operation and according to chief engineer Harold E. Erickson, much more satisfactory





ABOVE PHOTO: front view of Vickers hydraulic installation for pres-press. Right photo: new plant utilizes mill leftovers are green alder bolts to manufacture new "Cedawood" flakeboard panels. Wood conveyor here frames flake preparation building and steel flake silos which appear in the background of picture.

J. E. MICKLER, left, plant superintendent, and Dale Schubert, manager, admire some of the first runs of Cedawood from new plant at Everett, Wash.

Equipment Suppliers

Columbia Hardbord's own shops supplied a large share of the equipment and machinery. Suppliers include Meco (retort dryer), National Blower Mfg. Co., Minneapolis-Honeywell, General Electric, Eberhardt-Denver, Dodge Mfg. Co. and Jeffrey Mfg. Co. Glue room vessels and materials are products of Black Bros., Eastern Industries, Hercules Powder Co., American-Marietta Co. resins and Toledo (scales).

Other equipment: Star Iron Works pre-press, with Vickers hydraulic unit; Washington Iron Works 10-opening hot press, with Oilgear hydraulic unit; Washington Iron Works press charger and unloader; Yates-American sander; Greenlee skinner and cut-off saw.

material recovery is possible.

As the two caul lines emerge from the pre-press, each board is fed automatically into the hot press charger.

The third phase in the production line is the 10-opening 4 x 8-foot hot press. After a few minutes in the press the boards are discharged, via automatic unloader, to the board separator phase. At this point the board and its caul are separated automatically, the caul returning by means of rubber conveyor belts to its place in the production flow, while the board is lifted by automatic rubber suction cups and set down on conveyor belts leading to an automatic transfer table and the final finishing stages.

Boards are trimmed by a skinner saw and cutoff saw working as a unit to square up the panels. Finished panels pass through a sander and are then stacked for shipment.

The plant has no leftover material. Trimmings from the sizing machines are ground up into fines by a hog head and pass by air conveyor to the fire log building where the fines are converted into briquette type fuel by a new Sumner Briquettor.

Production of Hardboard By Countries of the World; U. S. Leads, Sweden is No. 2

(Figures given in thousands of metric tons; suggested formula for converting to square feet basis: 1 metric ton = 2939 sq. ft.)

	1951	1952	1953	1954	1955
United States	312	395	435	447	485
Sweden	254	186	215	302	353
USSR			70	80	50
Germany (Western)	88	63	51	64	80
Australia	26	36	49	62	67
Canada	39	47	49	48	62
Norway	46	39	47	53	53
Finland	54	35	46	63	70
France	39	38	44	56	59
Belgium	24	30	34	39	39
Italy	33	34	34	34	34
Czechoslovakia		15	20	21	24
Germany (Eastern)		10	20	13	19
Poland		15	20	22	22
United of So. Africa		15	20	25	na
United Kingdom	14	12	18	21	21
Austria	14	13	17	34	24
New Zealand	8	11	12	12	14
Argentine				15	16
Mexico		10	10	10	na
Spain			10	10	na
Japan	9	9	7	9.9	15
Ireland			7.4	9.1	9.1
WORLD TOTALS	**990**	**1130**	**1270**	**1440**	**1600**

(Includes other minor producers not shown above)
Source: UN-FAO

Hardboard Production in U.S.* 1/ (M sq. ft. ⅛-in. basis)

		Treated or Tempered	Not Treated or Tempered
1951	835,000		
1952	953,000		
1953	1,226,000	611,000	615,000
1954	1,267,000	656,000	611,000
1955	1,441,000	681,000	760,000
1956	1,533,000 prelim. est.)		

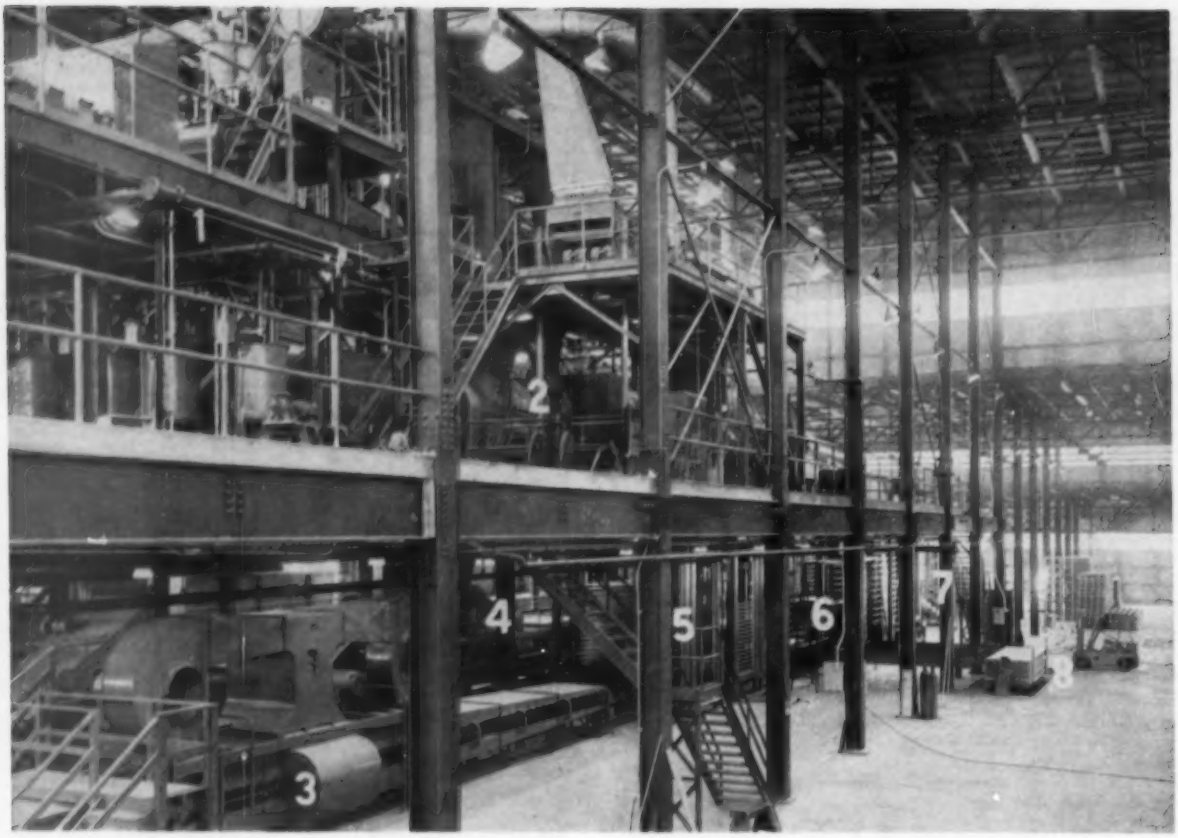
Insulation Board Production in U.S.* (M sq. ft. ½-in. basis, density 26 lbs. or less per cu. ft.)

1951	2,341,000
1952	2,297,000
1953	2,500,000
1954	2,650,000
1955	2,968,000
1956	3,040,000 prelim. est.)

* Based on U.S. Dept. of Commerce, Bureau of the Census, Industry Div., "Facts For Industry" data.

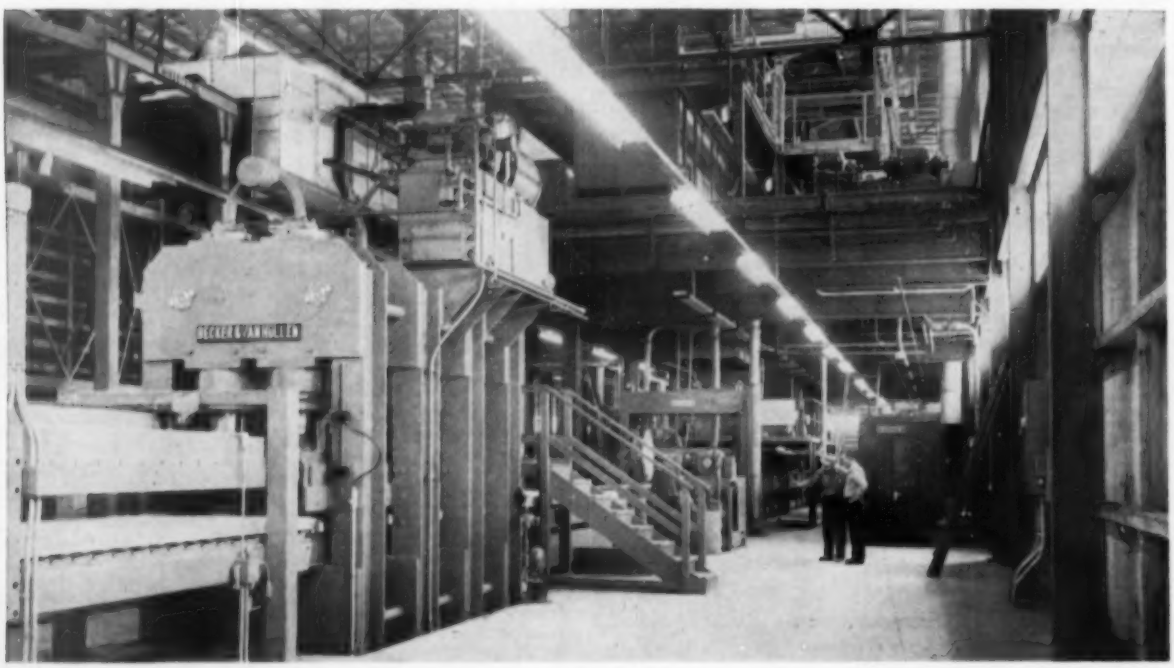
1/ Density over 26 lbs. per cu. ft. Includes only hard pressed boards manufactured by any process using **pulped** wood fiber as the basic raw material.

Does **not** include wood chip, flake, particle, or granular boards produced from chips, shavings, or coarse or fine sawmill wastes which are **not** pulped prior to fabrication.



OVERALL VIEW of Timboard plant (above) at Arcata, Calif. Production units are: (1) binder mixing; (2) binder spraying; (3) caul cooler; (4) mat forming; (5) caul storage; (6) caul separator; (7) hot press; (8) board stacker.

INSIDE VIEW of Rodiscraft, Inc. Timboard plant, showing part of production line, below. In foreground is pre-press with saw for cutting panels to length. Caul forming line is to rear. Main control panel is at right.



Two Men Operate Entire Production Line in Plant

Roddiscraft, Inc. starts Behr process automated Timboard plant at Arcata, Calif. manufacturing core stock for furniture industry.

Raw Material Comes Afar

INDEPENDENT CONTRACTORS supply and deliver wood to the plant, gathering refuse from mills within a 20-mile radius. In some cases this has increased lumber production of mills with burners too small to handle their volume of leftovers. Limited pitch, splits, checks and any number of knots are permitted, but no rot or bark is allowed in the process.

Contractors are paid on a delivered basis hauling five to seven tons on each load, using conventional wood trucks. Loads are weighed automatically on a Fairbanks-Morse Printomatic scale which dispenses printed cards giving gross and net weights.

After weighing, wood is dumped in the woodyard. During dry weather piles are kept sprinkled to minimize checking. A forklift moves wood to the feed table for the woodsaw which utilizes an Irvington eight-saw sawmill trimmer. The woodyard equipment was designed and manufactured by Eureka Boiler Works, Eureka, Calif. Wood is automatically spaced, even-ended and then straightened for uniform cutting before being belt-transported to a 90x15x15 foot redwood tank where it is soaked before being conveyed on into the plant.

Special Shaving Machines Prepare the Raw Material

BASIC MATERIAL of which Timboard is made is specially-prepared shavings. Ordinary wood planer shavings cannot be used.

Wood is brought in from the soaking and storage tanks on conveyor belts from which a man feeds each of the six German-manufactured shaving machines. From the shavers shavings are blown directly to cyclones on the roof from where the air transport system distributes them to green storage bunkers, after which they are organized as to thickness for core and surface material in the board manufacture. Nearly each stage of shaving preparation utilizes one of the 16 roof cyclones.

From the green storage bunkers shavings are air-transported to the mills where they are reduced to proper width and length. One man operates the five mills. Following milling, shavings are screened to separate the undesirable material which is blown to the plant's nearby fuel storage bin.

From the screens shavings are dropped onto the endless metal screen belts rolling through the three dryers. Shavings are dried to a five per cent moisture content in about six minutes using hot water heat. A single man controls this drying operation. A deluge-type water system is installed on the dryers to operate automatically in case of fire.

Again, shavings go through roof cyclones and back down to the binder-

Timboard's Properties

Although initial production is entirely ¾-inch board, the plant is equipped to handle thicknesses of ⅜ through 1-⅛-inches. Specific gravity of the medium density board is 0.60. *A* 4x8-*foot by ¾-inch Timboard panel weighs* 78 *lbs. as compared to* 75 *lbs. for a Douglas fir plywood panel of the same size.*

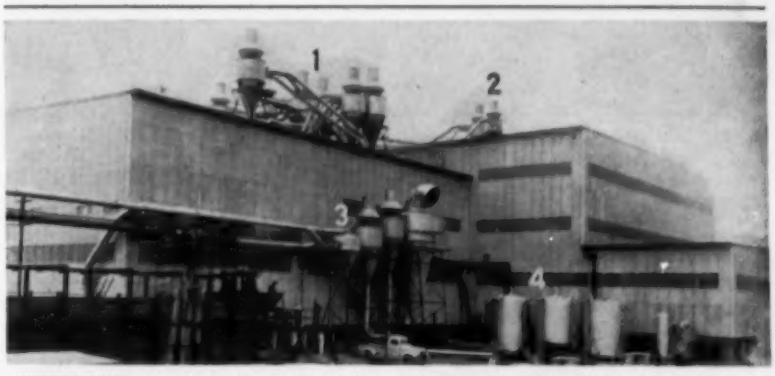
The board is not meant to replace plywood sheathing or wall paneling, but is designed as an under-core for hardwood veneers or plastic where cross-banding is not required primarily for quality furniture useage.

According to Mr. Molloy, plant manager, the board shows excellent woodworking characteristics. It can be routed, sawn, drilled, edge-glued and otherwise worked with ordinary woodworking machines. He says the board will not warp, twist or cup.

The product will be promoted nationally and will be sold through 21 *distribution warehouses of the Roddis organization throughout the United States.*

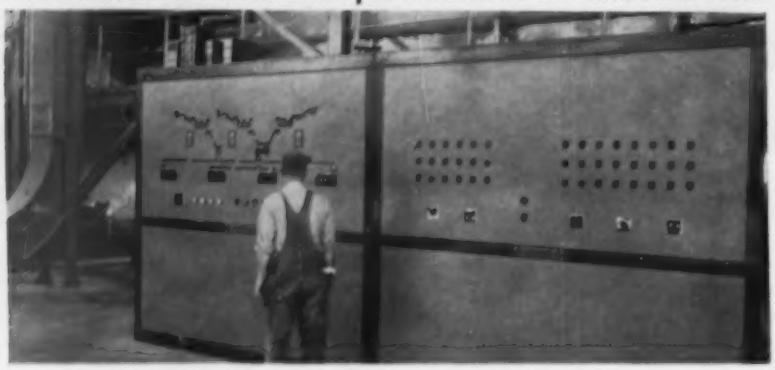
Highlights of TIMBOARD production

- **Product is made by Roddiscraft, Inc. at Arcata, Calif.**
- **Product is TIMBOARD, a medium density coreboard. Planned annual production is 15 million square feet of ¾ inch board.**
- **Raw material is milling residues (sawmill edgings, slabs and planer ends). About 150 tons daily are utilized. All species in immediate area can be used, but only Douglas fir is used at present. Roddiscraft's plywood plant ultimately will furnish some raw material.**
- **Plant costing $3.7 million uses the Behr process, was nearly all fabricated in Germany, with 11 German engineers on hand during construction to supervise installation of specialized equipment. Process is nearly automatic, with 19 men employed in preparation and production of the board.**

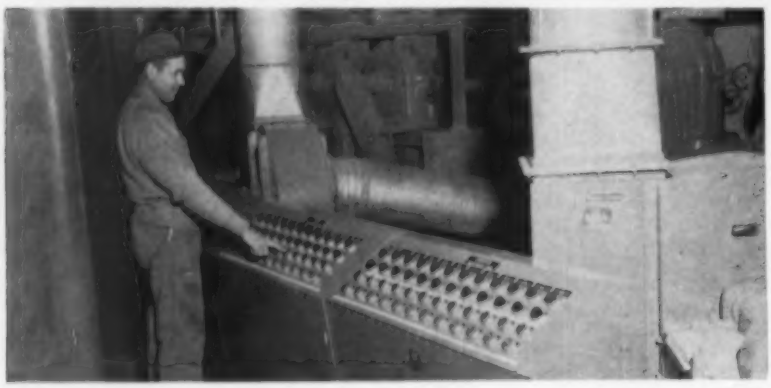


OUTSIDE VIEW from back of new Timbord plant (below) of Roddiscraft, Inc. at Arcata, Calif. Production sequences shown are: (1) green shavings; (2) dry shavings; (3) exhaust and air collection system; (4) resin and glue storage.

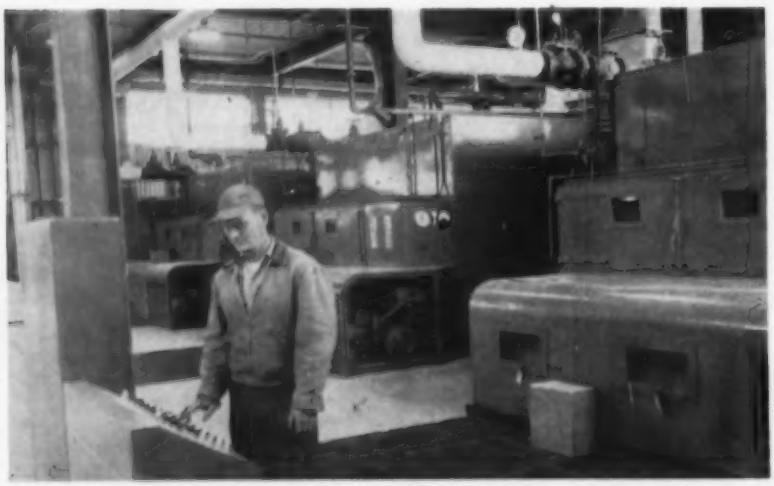
Automation Controls Principal Processes in Timboard Plant



MAIN CONTROL board for glue mixing and spraying operations is shown in above picture.



SQUARE D CONTROL panel for the five mills used in the manufacturing process.



OFFBEAR END of dryers with control panel for automatic processing of Timboard.

It's a Fast Process!

In designing the present plant lay-out emphasis was given to keeping production on a continuous-flow basis with direct line material flow except for limited live storage provided to average out variations in wood and fiber moisture content and to add more flexibility to the entire production system. The extent to which the flow is direct and continuous is indicated by the time elapse from green veneer to pressed panel.

Fiber emerging from the plywood plant as green veneer will normally be arriving at the press loader in less than two minutes not considering storage time of chips. Pressing at 330 to 370 degrees F. and 650 to 900 psi. takes but 5 to 10 minutes depending on density and thickness of the panels concerned. The rapidity of the process makes continuous full-time quality control essential.

Personnel

EXECUTIVE VICE PRESIDENT: *Robert T. Beggs, Marshfield, Wis.*
GENERAL MANAGER: *Arcata Operations: Kirk R. Cooper*
TIMBOARD PLANT MANAGER: *Robert K. Molloy*
PLANT SUPERINTENDENT: *Roy Hunt*
QUALITY CONTROL SUPERINTENDENT: *William Ferry, Richard Harmer*
MAINTENANCE SUPERINTENDENT: *Ralph Davis*
FOREMEN: *Russell Luce, Alden Sedlack, Frank Bishop*
SHIPPING FOREMAN: *Don Hall*
SANDERMAN: *Harvey Griffin*

spraying section where after it is mixed, the urea-formaldehyde-base resin is sprayed onto the shavings through the control of automatic weighing devices. Any variation in the volume of shavings increases or decreases the amount of resin being sprayed.

The binder mixing is organized, pumped and controlled by one man. Hardening agents and wax are also included in the binder makeup.

Two Men Control Plant's Board Formation

THE PREVIOUS PROCESSES take place on the second and third floors of the plant. Actual board-making is accomplished on the plant's main floor in an endless production line. Here two men control the entire operation, one man supervising the mat-forming and the other controlling the press.

After spraying, shavings are stored in surge-bins from where they are metered onto 4 x 16-foot aluminum cauls with a layer of surface material applied first, then core material, and then another layer of surface. Cauls travel through the line on lugged chains with limit switches starting and stopping them at the proper times.

After forming, the mat is sawn to length by a cut-off saw which slowly follows the caul as it proceeds through the line. Trimmings are sent back into the mat-forming production lines.

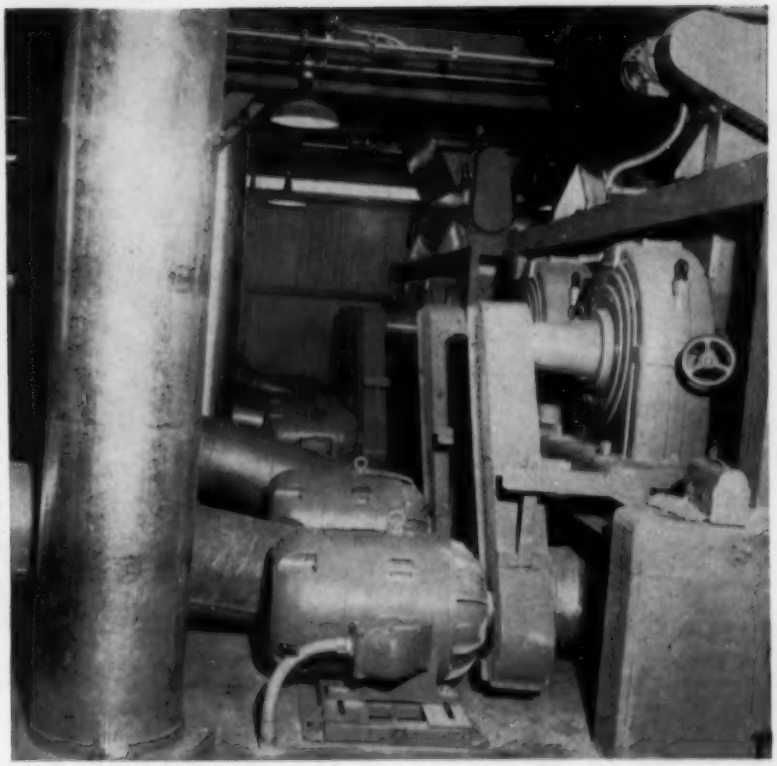
The mat is then weighed to a close tolerance with any variances later causing the mat to be kicked out of the line. After weighing the mat is pre-pressed by an hydraulic press to a three-inch thickness. This is at one end of the mat-forming line. Cauls then go across a short transfer table to start back in the reverse direction along the pressing line.

At this point the automatic memory device which was activated at the caul-weighing point kicks any reject mats off into a hopper with the material returning into the production process. Empty cauls go into storage racks for later reintroduction into the line.

THE ELEVATOR-TYPE press loader receives its full charge of 15 boards and is ready to load the press upon

IN PHOTO, from left, are: Kirk Cooper, Roddiscraft vice pres. and manager of operations; Robert K. Molloy, Timboard Div. mgr.; Donald Seip, Seip Co., which engineered job.

TIMBOARD PLANT manager Robert K. Molloy supervises the production details of process



FIVE MILLS used in process are powered by G. E. 50-hp 220/440 motors. Mills are automatically controlled through push-button panels, providing accurate manufacturing techniques

completion of the 15-minute pressing cycle. The hot-water-heated press weighs 200 tons. After pressing, boards are discharged into an elevator receiver from where they go back onto the conveyor line to the caul-separator. Here cauls drop to one side while boards drop to the other and are chain-conveyed to an automatic stacker where they are picked up by lift truck to set aside for curing.

After having discharged their boards, empty cauls are fed into storage racks where they are stored until needed again in the line. They are fed individually back onto the chain conveyors, run through a forced-air cooler and sent back across a short transfer table back onto the mat-forming line.

After boards have cured for a number of days to allow the temperature and humidity to equalize, they are lift-truck-conveyed to a conventional sizing and sanding operation run by three men. Shipment is made by both rail and truck.

Principal Equipment

Most production equipment was manufactured by the following German manufacturers: **Becker and Van Hullen, Bezner, Drais, Cendux-Work, Schenck, Schilde.**

Hydraulic equipment for press: **The Oilgear Company**

Some **General Electric Motors**

Some Electric Switching Equipment: **General Electric, Square D, Cutler-Hammer**

Dryer deluge valves: **Suprotex by Automatic Sprinkler Corporation of America**

Sander: **Yates-American 5800-8-drum**

Skinner saws: **Globe**

Cutoff saws: **Mereen Johnson 435H**

Forklifts: **Clark**

Some blowpipe work: **Humboldt Sheet Metal Works.**

Why German Design?

Timboard plant manager Robert K. Molloy said that all machinery in the new plant with the exception of the woodyard sawing equipment and the sizing and sanding equipment is of German design and fabrication.

Molloy says, "The Germans, because of their scarce basic raw materials and their past need for conservation, have developed many synthetic wood products. We, here in the United States, are only aware of this raw material scarcity that has been with the Germans for 50 years. Therefore, we decided to go to Germany to select a proven-quality type board process rather than to take the time to develop such a process through American ingenuity and machinery."

Roddiscraft sent Molloy to Germany to inspect several plants. This was part of a three year quest for the most desirable board process.

The Arcata plant is the 22nd installation of its type to be built with others located in Japan, South America, Newfoundland, Italy, Scotland, Austria and West Germany.

This is the first plant of its type in the United States.

Automation Guides Nearly All Plant Processes

MOST INTENSE USE is made of relays, automatic delay mechanisms and limit switches, of which there are hundreds controlling the several hundred electric motors in the lines. Basic control is maintained by large control boards which have electric lights on a schematic diagram showing location of every motor in area controlled by the panel.

Lights signify which motors are running. The operator can determine the condition of his system through observing the panel. Such items as storage depths in shaving bunkers are also indicated by lights.

In addition to normal automatic operation, operator can put his system on manual control and start or stop any individual motor through a series of motor control switches.

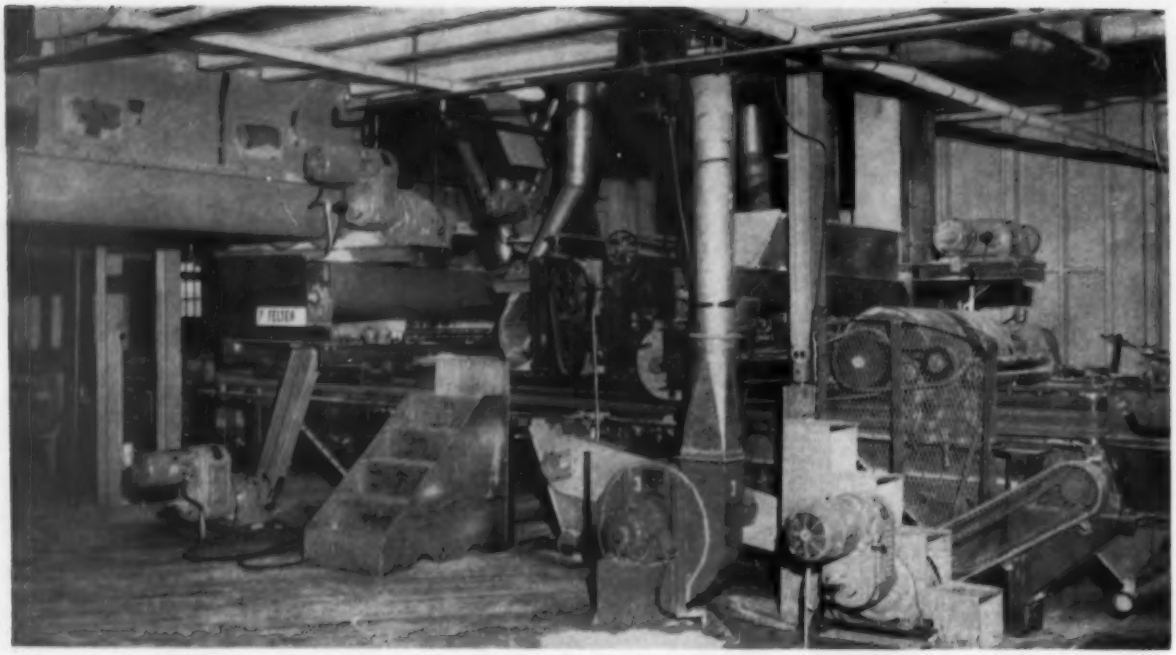
A total of but 57 men are employed on all three shifts of the organization.

Power Plant Features

No steam is used in the Timboard plant. Power used consists of electricity which is commercially-supplied and hot water and compressed air which are furnished by the company's nearby power plant.

A Union Iron Works boiler supplies 50,000 pounds of hot water an

(*Continued on page* 152)



LEBANITE PATENTED air felter, developed by Cascades Plywood, forms mat of loose, dry fiber on traveling cauls and compacts mat automatically. Felting of hardboard involves two more automatic steps: placing a layer of wood fines on bottom and top of mat.

Board Plant Converts From Shavings to Veneer Chips

Cascades Plywood Corporation manufactures two hardboards in process with many unusual features.

Product Characteristics

The board is difficult to properly and adequately classify catagorically. Although some hardboard experts may claim that Lebanite does not meet the technical qualifications of a hardboard (by identification), it successfully competes marketwise for uses normally considered as "reserved" to hardboard.

As to the "natural bond" technicality, it's pointed out that "very little, if any, more resin binder is used in Lebanite hardboard than in some products unquestionably qualifying as hardboard."

Cascade's board was classified as hardboard by Wayne C. Lewis, USFS Forest Products Laboratory, in his report on American hardboard and insulation board industry presented at the FAO conference in Geneva earlier this year.

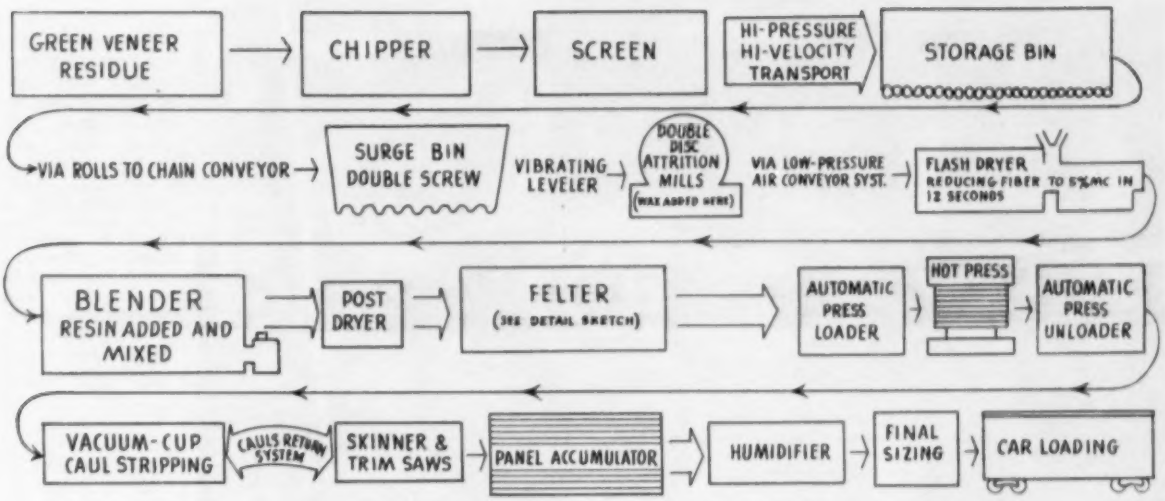
Facts About This Hi-Density Dry-Process S-2-S Board

- **Cascades Plywood Corporation, Lebanon, Ore. produces it.**
- **Raw material is green veneer chips, which aren't steamed.**
- **Two types of high-density LEBANITE panels are produced:**
  one for conventional hardboard uses
  one for high pressure decorative plastic laminates
- **Limited production started about three years ago, with planer shavings as raw material, using an original dry process. Emphasis was given to product and process improvement.**
- **Company discontinued production last year and analyzed the production process. Major changes were made during conversion period with supplementary modifications and the addition of more automatic equipment scheduled for installation this summer.**
- **Present three-shift production is at Lebanon, Ore., in the Lebanite Products Div., next to the company's plywood plant.**
- **Daily output is 120,000 square feet (⅛ inch basis).**

Plant Changes Made

Last year the company made a comprehensive evaluation of the entire manufacturing process to bring production into a more competitive position. The following major plant changes were made:

- Converting from planer shavings to green veneer chips from company's plywood plant for Lebanite's raw material.
- Installing high-pressure high-velocity Rader Pneumatics conveying system for transporting chips from plywood to Lebanite plant.
- Changing refining equipment to new type high-speed Bauer double disc attrition mills.
- Replacing drum type dryer with high-speed direct-fired Heil flash dryer.
- Installing high-speed mixing equipment.



FLOW SEQUENCE for Cascades Plywood Corp's. Lebanite production

- Adding humidification facilities.
- Installing two master control panels making it possible for three men to handle all production processes from the point of chipping to the automatic loading of panels ready for humidification.

Several Original Features...

have been incorporated into the production facilities. Actually the entire concept is unique and some of the processing components developed by the Cascades organization utilize principles not previously associated with fiberboard manufacture.

Chips flow air-borne from the chipping-screening section of plywood to a 20-unit storage bin in the board plant at 75 mph. (120 ft. per sec.) via a Rader Pneumatics high-pressure conveyor.

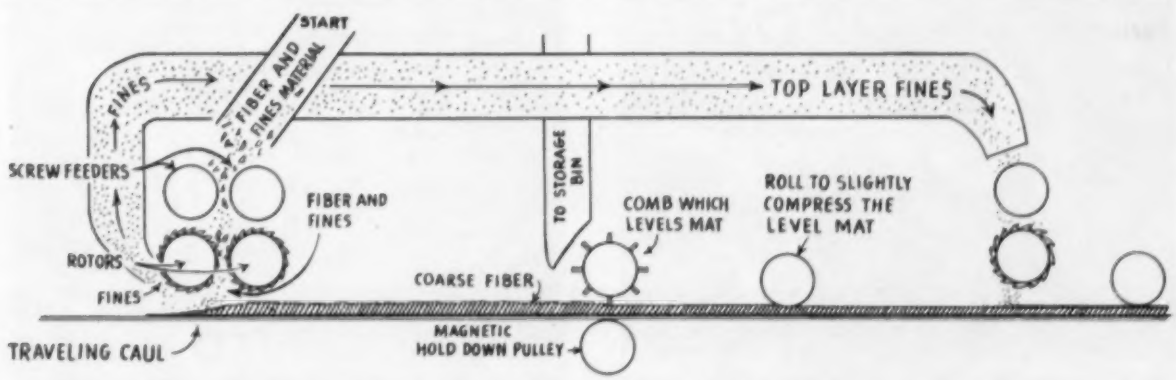
Special "tri-metering" rolls in two series, form a false bottom in this storage bin. These rolls, of Cascades' patented design and built by American Manufacturing Co. for this application, appear in cross-section to have a profile of a circle-equilateral triangle combination. These rolls, powered, cause chips to fall between the rolls onto chain conveyors beneath at a controlled rate for transport to a surge bin, (J. J. Ross Mill Furnishing Co.).

This surge bin, equipped with two variable-speed screw conveyors, provides volume control of chip (fiber) flow through the entire system. It meters chips into two gravity conveyor systems, each terminating at a vibrating chip leveler (manufactured by Syntron Co.) which in turn discharges directly to a twin-screw feeder which is an integral component of the attrition mill.

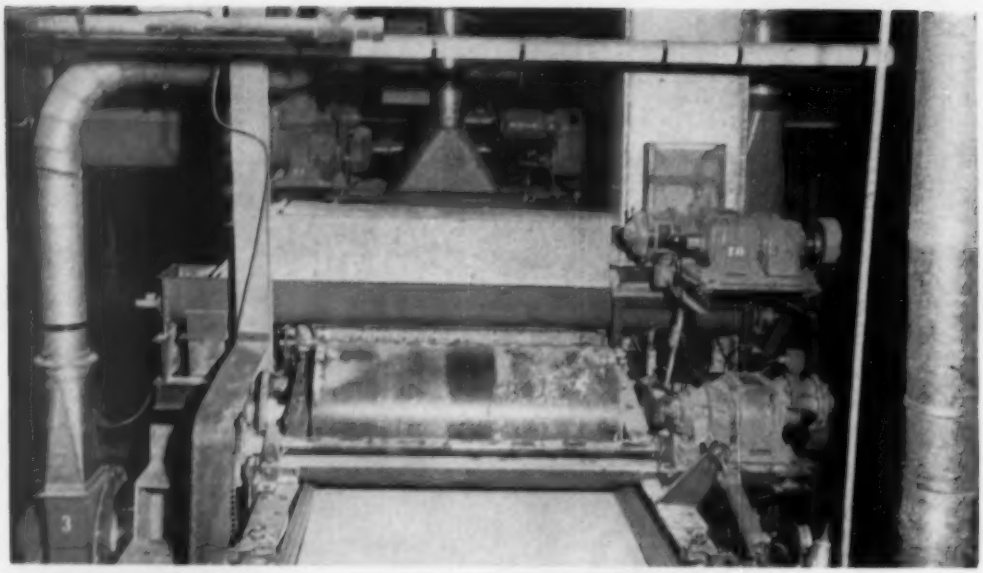
These vibrating chip levelers—two 36-in. Bauer 445 double-disc attrition mills with each disc driven by 150 hp. motor—turn at abnormally high rate of speed to extensively defiberize the uncooked chips. The attrition mill discs operate at close tolerances and rotate at 1800 rpm. in opposite direction from each other. Wax is added to chips at the defiberizers to impart dimensional stability and moisture resistance to the finished board products.

Chips enter the attrition mills at an average of 70% moisture content (on dry basis) and the resultant fiber

J. R. STILLINGER (right) Technical Director, Cascades Plywood Corp. Lebanite Products Div., former Research Dir., Ore. Forest Prod. Lab.; John Lewis (left), quality control dept.



LEBANITE FELTER designed, developed and patented by Cascades Plywood Corporation



OUTFEED END of felter showing (from front to rear) dry fiber mat emerging on caul, second compressing roll, and toothed rotor assembly applying wood fines to top of mat.

SUCTION AIR SCOOP, beneath which caul plates pass to enter felter (r.), facilitates forming layer of fines on both faces of hardboard mats. Scoop's suction draws wood fines from point where fiber settles on caul toward scoop. Half these deflected fines settled on caul ahead of mat-forming position and remainder enters scoop for transport to back end of felter.

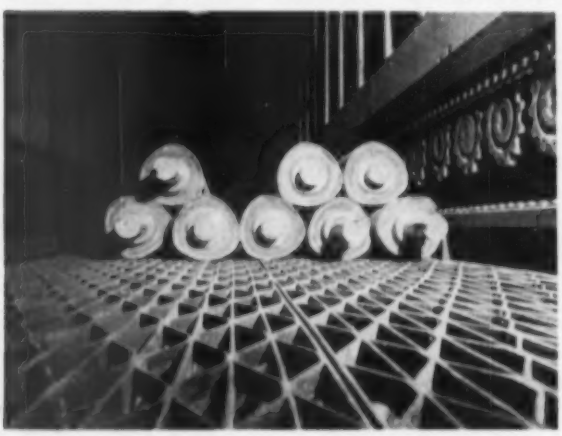
emerges from the mills at approximately 50% mc., the condition of the fibrous material when picked up by an American Sheet Metal Works low-pressure blower system for transport to the dryer.

Approximately 12 *seconds* after the fiber enters the Heil direct-fired *flash dryer* (manufactured by Arnold Dryer Division of Heil Co.) it emerges at five per cent mc., having been carried 75 ft. through the triple-pass drying chamber in air suspension.

Dry fiber goes via American Sheet Metal low-pressure transport to a Grenco No. 3 blender where phenolic resin is added at specified proportions by a Milton-Roy Constametric pump. Again the fiber becomes air-borne, this time passing a post-dryer — a steam-coil heat exchanger designed to insure precise final moisture content control, enroute to the felter.

Fiber Enters the Felter . . .

via two parallel horizontal screw feeders, dropping from these onto disper-



END VIEW (above photo) of tri-metering rolls, built by American Mfg. Co. to Cascades design, for feeding chips from storage bin. Right photo: one of two Bauer 36" No. 445 double-disc attrition

mills converting raw green veneer chips to wood fiber. Each disc driven 1800 rpm. by individual 150 hp. motor. A Syntron (Co.) flow-evener (top left) feeds chips to attrition mill feeders.

sing rotors consisting of a series of circular saw-shape plates separated from each other by 3/4-in. spacers. One such rotor is mounted immediately beneath each screw feeder to break up clusters of fibers. The loose fiber gravitates from these toothed rotors onto traveling cauls passing lengthwise through the felter.

A suction air-scoop extending across felter, just above the caul and immediately ahead of point where fiber feeds onto the caul, draws a portion of the lighter wood fractions (fines) away from the mass of cascading fiber. About half of these actually enter the suction scoop and the rest—those too heavy to reach the scoop—settle on the moving caul in advance of the prime loading point. Thus a thin layer of wood fines forms on the caul immediately ahead of the point where a thick fiber layer, the main loading charge, is superimposed on the fines.

Key Personnel

Vice-Pres.: A. E. Anderson, general manager of Cascades' Lebanon plants.

Technical Director: J. R. Stillinger, formerly research co-ordinator of Oregon Forest Products Laboratory.

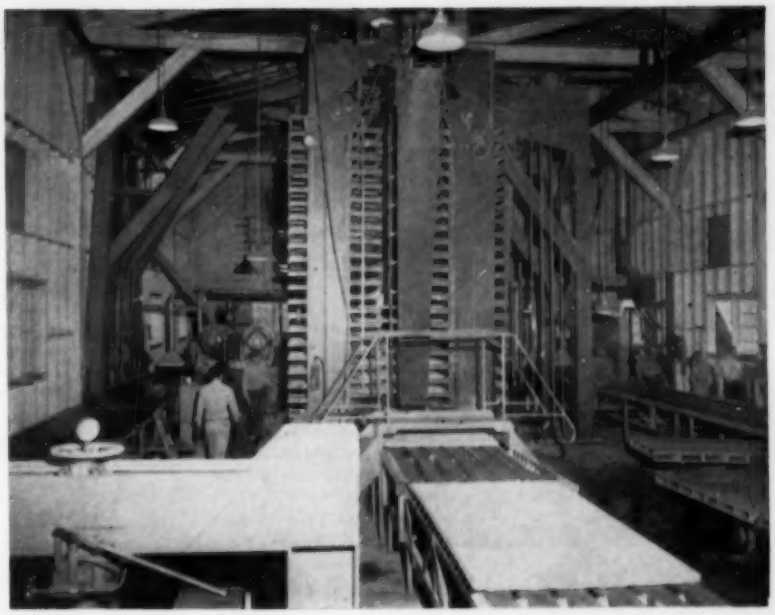
Superintendent: P. L. Kvale

Sales Manager: Orvie M. Johnson

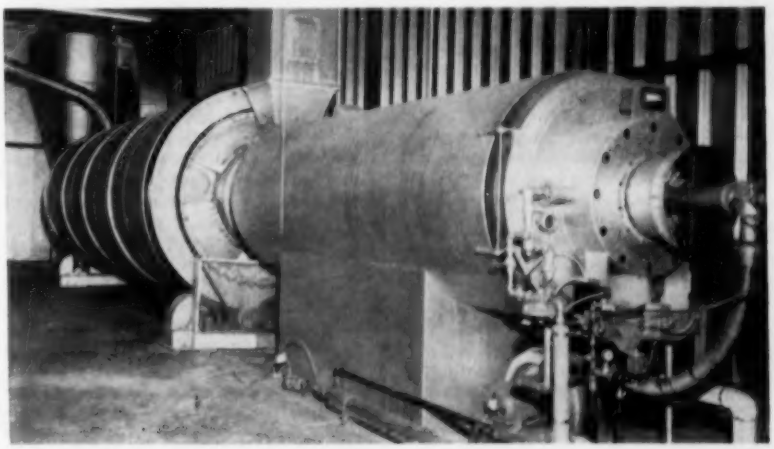
Fines which do not enter the scoop are transported through a "dust system" to the back end of felter and there applied to top side of mat through a screen by a single screw-feeder dispersing-roll combination similar to the pair operating at front end of the felter.

Subsequent to charging the caul with fibers, the resultant mat moves under a "comb roller" which removes all excess fiber. At the point where the comb engages the mat and cuts it down to specified thickness, a magnetic hold-down roll operating beneath the comb holds the caul plate at a

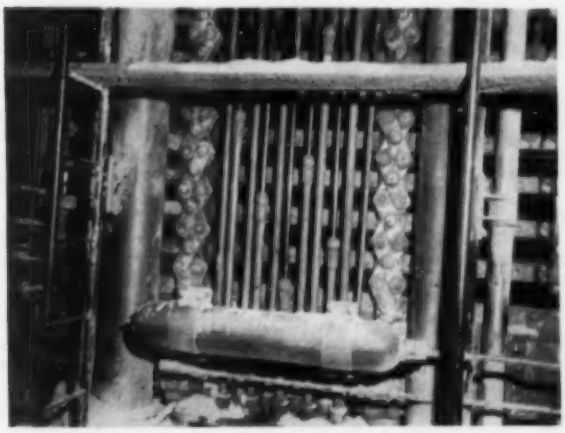
(*Continued on page* 122)



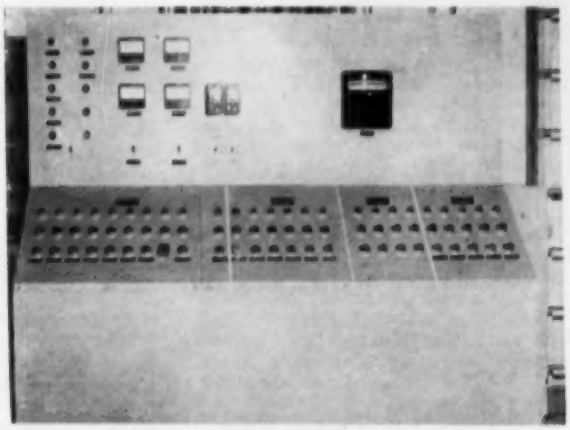
IN ABOVE picture, mats are shown enroute to an American Manufacturing Company elevator-type loader which serves a Baldwin 4 x 8 foot 20-opening hotpress.



FIBER ENTERING Heil direct-fired flash dryer at 50% mc. emerges 12 sec. later at 5% mc. after being airborne 75' (3 passes) through revolving cylinder. Unit receives fiber from one low-pressure blower system, discharges to another, both by American Sheet Metal Works.



PANTOGRAPH, built to Cascades design by Washington Iron Wks, installed on Baldwin hotpress eliminates precuring of mats.



ONE OF TWO Feuch (Electric Co., Ptld) Cascades-design panels which controls processing from chipping through blending.

OPENING SESSION of First International Consultation on Fiberboard and Particle Board held at Geneva, Switzerland. Shown in the assembly hall, first row, from right to left, are: G. G. Marra, U. S. A., Kamal, Ismail, Egypt, and P. Gibson, Sweden.

First International Consultation on Fiber Board and Particle Board

By
GEORGE G. MARRA

"THE PROCESSED-WOOD BOARD industry stands high among industries responsible for post-war economic expansion." So spoke Mr. Marcel Leloup, Director of the Forestry Division of the Food and Agriculture Organization, in opening the first international consultation on fiber board and particle board in Geneva, Switzerland, January 21 to February 4, 1957. This consultation had been called by FAO of the United Nations in cooperation with the Economic Commission for Europe in recognition of the vast potential for further expansion of this rapidly-growing industry.

Among the reasons cited by Mr. Leloup for the interest of the United Nations in this remarkable processed-wood development was that it appears to provide an answer to the problem of utilization of non-commercial species and of forest industry residuals. In addition, it bids well to cure housing shortages in under-developed areas where raw materials for this class of products usually are available in abundance.

Within a relatively short space of time, the annual production of processed wood board has reached 5,000-000 tons, a figure which compares favorably with the production of such products as aluminum, plastics, and plywood. Roughly two-fifths of this five million tons is particle board, a veritable newcomer in the field. Scarcely ten years old, particle board production exceeds that of either of the older industries of insulation board and hardboard. The particle board industry is expected to continue to outstrip its companion products in total production, according to data compiled by the United Nations Secretariat at this consultation. Both economic considerations and versatility were given as reasons for this trend. Further evidence of this trend toward particle board was furnished by the fact that the highest attendance was recorded during the sessions on processes and equipment for particle board.

Mr. Marra is Head, Wood Technology Section, Division of Industrial Research, Washington State College, Pullman, Washington

THE BACKBONE OF THE GENEVA consultation was a series of about 100 technical papers, or background papers, prepared by experts from all over the world. Many of these experts were in attendance and presented a verbal summary of their papers, as well as taking part in the discussions. Actually, there were about 36 countries represented among the 350 registrants during the fifteen-day conference. The Federal Republic of Germany was first in number of delegates with 85, followed by Switzerland with 33. The United Kingdom had 26 delegates, while the United States held fourth place with 21, most of whom were from Eastern United States.

The main assembly hall of the Palais des Nations where all the plenary sessions were held, is admirably suited to multi-lingual discussions. Highly skilled interpreters carried on simultaneously translations of most of the languages spoken. Absence of interpreters for the Germans, recognized world leaders in the technology of particle board manufacture, was a tragedy of the consultation. This anamolous situation stemmed from the political status of the German Republic and was beyond the control of FAO and ECE. The Germans, well-represented by written contributions and key personages in the industry, were not entirely without voice, however. Some spoke English fluently and others made use of a remarkable public stenographer who recorded the conversation in German shorthand and immediately thereafter read off an English translation, usually in less time than the original speech.

The papers submitted, and the agenda of the consultation, were based upon the following sub-divisions of the subject:

I. **Introduction**
II. **Product Description, Nomenclature, and Definitions**
III. **World Consumption, Production, and Trade**
IV. **Raw Materials**
V. **Processes and Equipment**
VI. **Economic Aspects of Production and Marketing**
VII. **Properties, Applications, and Uses**
VIII. **Research Needs to Enhance Future Developments**

Insulation board, hardboard, and particle board were each covered separately under these general headings, although discussions frequently brought out the overlapping character of the products. All of the background papers were condensed by the Secretariat into eight basic documents under the above headings. These will form chapters in the final official publication of the United Nations. The principal work of the delegates from the various nations was to correct, clarify, and finally to approve these basic documents.

UNFORTUNATELY FOR THE WORLD at large, the meaty background papers will not immediately be published and may not become available for several years because of the bottleneck in the printing establishment of the United Nations. Sets of these papers, however, were distributed to each participant in a choice of languages, English, French, or Russian.

Mr. Wayne Lewis of the Forest Products Laboratory in Madison, Wisconsin was the official United States consultant to the FAO on this project. Mr. Lewis spent several months in Rome and Geneva helping to set up the consultation, arranging for background papers, and preparing several papers himself.

Although there was a general tendency to avoid controversial or contentious questions, nevertheless some excellent arguments developed during the sessions. Most people would correctly have guessed that the outstanding argument should have occurred on the subject of flat press processes *vs.* extrusion processes for particle boards.

The only logical conclusions which

could be drawn from the volume of evidence and opinions presented was the fact that the utilization of particle boards in furniture, vehicles, and buildings calls for a variety of types. Depending upon specific requirements, enonomics, raw materials available, and a host of other factors, the product of one process may prove to be better than the other. Current trends indicate that both types of processes are being and will continue to be installed, each after careful listing of all the factors involved, followed by studious evaluation.

OTHER INTERESTING ARGUMENTS developed on such subjects as the coating of particles *vs.* "spot" gluing, on the choice of a generic term for the group of boards presently known as "particle" boards, on a general family name for the entire series of composition boards, and on steam *vs.* hot water for heating the platens of hot presses. European plants use hot water exclusively while in the United States steam is used in all presses for board manufacture. This, seemingly, would be a question amenable to precise engineering analysis, but the subject was dropped after inconclusive discussion.

One of the most significant technical contributions of the United States to world advancement in the board field was the development of dry or semi-dry processes for hardboard manufacture. These processes, initiated in the State of Washington, have captured wide attention primarily because equipment costs are substantially below the costs for comparable wet process plants, and because stream pollution problems are eliminated.

J. A. Hall, Director of the Forest Products Laboratory in Madison, Wisconsin, brought down applause with a discussion of the free enterprise system. He concluded with compelling reasons why economics would play the leading role in determining the future course of the board industry in the United States. The Russian delegation gradually disappeared during this part of the discussion.

The consultation was highly worthwhile and attained its objective of developing a factual guide for sound growth of the industry on a worldwide basis. Mr. Egon Glesinger, Deputy Director, Forestry Division of FAO, and the Secretariat staff are to be commended for their foresightedness in calling this consultation at this time and for the tireless efforts required to coordinate and stage the event.

It was a common feeling among those who attended that the United Nations through FAO should continue to foster international agreement and understanding of terms relating to the industry, of test methods, and of technical requirements for the products. Lastly, it was felt that similar consultations should be held periodically in the future in order to provide an opportunity for the exchange of information and for the making of personal contact among people with mutual problems.

Consultation Reports Conclusions

• Manufacturers in many countries represented believed that over-investment has taken place and that consumption is lagging behind production potential. Under these circumstances existing producers who depend largely on export markets, view with some alarm establishments of new capacity in regions outside the traditional producing centers. There is danger, they point out, that if the new plants are based on unsound economic lines, they may require permanent and excessive protection if they are to survive; such instances have already occurred.

• In many of the countries in these less developed regions consumption of fibreboard is likely to remain at a very low level so long as the countries concerned have to rely entirely on imports. Any expansion of domestic capacity in these countries will considerably stimulate consumption. Provided those countries which now rely mainly on imports have adequate supplies of suitable raw materials, with the possibility of producing board economically for the markets envisaged, there is a case for new capacity.

• Expansion of the particle board industry—scarcely a decade old—is even more rapid than had been indicated by earlier estimates. Yet but a few of its potential outlets have been explored. Marketing possibilities appear excellent in most countries; in others, however, there may be a danger in the near future that supplies will at least temporarily outrun effective demand. Longer term future for particle board depends mainly on its relative price—any reduction in price relative to those of alternative materials could extend its utilization—and on the success achieved in the search for new applications.

• While some expansion of international trade in particle board may be expected, it is unlikely that the proportion of world production entering long-distance trade will ever be as high as for hardboard. Reasons: its bulk in relation to its value, its raw material requirements, which are less exacting, and the fact that economics of plant size are less pronounced.

Special Acknowledgement

The Editor of THE LUMBERMAN acknowledges the special permission granted to reproduce portions of some of the 100 technical papers presented at the International Consultation on Insulation Board, Hardboard and Particle Board, held at Geneva, Switzerland, from January 21 to February 5, 1957.

This Consultation, sponsored by the Food and Agriculture Organization of the United Nations, drew technical authorities from all nations and countries. The combined knowledge of these men brought into sharp focus recent advancements made in the board field. We are pleased to make this information available to our readers.

The Consultation papers reproduced in this special issue are not individually credited, but appear as by-lined articles with author credit given in the one-column headlines. Similarly, many of the tables listed in this issue were prepared by the Consultation. "At right is shown the editorial style of a typical article extracted from ons of the technical papers presented at the Consultation."

Features of Continuous Formation for Particle Board

By
ALEC M. FISKEN

Weyerhaeuser Timber Co., Tacoma, Wash.

• Forming as applied to particle board manufacture involves conversion of a bulk mixture of particles, binders, and other additives to a compacted mat suitable for consolidation under heat and pressure to rough pressed board. Continuous forming requires that both the flow of particles and the travel of cauls or carrying medium be continuous and at a uniform rate.

Essential features of a continuous forming section include the operations of metering to achieve uniform flow in terms of weight per unit of time; spreading or loading to convert uniform weight per unit of time to uniform weight per square foot per unit of time; particle orientation to achieve desired product characteristics; compaction or prepressing to stabilize the mat for handling and reduce mat thickness, hence the size and cost of the consolidating press; and, where required, mat separation to convert an endless ribbon to individual mats for loading to a multi-opening platen press.

Process control equipment for continuous forming systems while somewhat more complex than that required for batch forming is readily available and has been successfully demonstrated in operating plants.

Although continuous forming is suitable for almost any scale of production, the advantages of this method over batch or semi-continuous operation becomes more marked as the linear speed of manufacture is increased.

Board Trade Associations

AUSTRIA

VERBAND DER OESTERREICHISCHEN HOLZFASERPLATTEN-WERKE; address, Dr. Karl Lueger, Ring No. 12, Vienna.

FEDERAL REPUBLIC OF GERMANY

VERBAND DER DEUTSCHEN FASERPLATTENINDUSTRIE UND VERWANDTER BETRIEBE e. V.; address, Franz Rucker, Allee 19/21, Frankfurt/Main (16).

VERBAND DER DEUTSCHEN SPERRHOLZUND SPANPLATTENINDUSTRIE e. V., address, Franz Rucker, Allee 19/21, Frankfurt/Main (16).

FINLAND

FINNISH WALLBOARD INDUSTRY ASSOCIATION (FENNOBOARD); address, Kaivokatu 10, Helsinski.

FRANCE

FEDERATION EUROPEENNE DES SYNDICATS DE PANNEAUX DE FIBRES (FEROPA); address, 36 Avenue Hoche, Paris 8e.

NORWAY

NORWEGIAN WALLBOARD ASSOCIATION; address, Solplassen 1, Oslo.

SWEDEN

SWEDISH WALLBOARD ASSOCIATION; address, Kungstradgardsgatan 18, Stockholm.

UNITED KINGDOM

BUILDING BOARD MANUFACTURERS' ASSOCIATION OF GT. BRITAIN LTD.; address, Melbourne House, Aldwych, London, W. C. 2.

FIBRE BUILDING BOARD DEVELOPMENT ORGANIZATION LTD. (FIDOR); address, 47 Princes' Gate, (Exhibition Road), Kensington, London, S. W. 7.

BUILDING INDUSTRY DISTRIBUTORS; address, High Holborn House, 52-54 High Holborn, Long, W. C. 1.

FIBRE BUILDING BOARD AGENTS ASSOC., LTD.; address, Pinners Hall, Austin Friars, London, E. C. 2.

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THE HARDBOARD ASSOC.; address, 205 W. Wacker Drive, Chicago 6, Ill.

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THE INSULATING SIDING ASSOC.; address, 530 Echo Lane, Glenview, Ill.

PARTICLE BOARD ASSOC.; address, B. F. Swain Jr., President, c/o Swain Industries, Seymore, Indiana.

WESTERN PARTICLE BOARD ASSOC.; address, Mehin Starnes, President, c/o Chipboard Products, Grants Pass, Oregon.

Insulating Board Producers

Company	Plant Location
Abitibi Corp (under construction)	Alpena, Mich.
Arizona Fiber Products	Phoenix, Ariz.
Armstrong Cork Co. (Temlok)	Pensacola, Fla.
Armstrong Cork Co. (Temlok)	Macon, Ga.
Barrett Div., Allied Chemical & Dye Co. (Maizewood)	Dubuque, Iowa
Barrett Div., Allied Chemical & Dye Co. (Maizewood)	Sunbury, Pa.
Bird and Son, Inc.	Phillipsdale, R. I.
Celotex Corp., (Celotex)	Marrero, La.
Celotex Corp., (Celotex)	L'Anse, Mich.
Insulating Board Div., Kaiser Gypsum Co. (formerly Fir-Tex Insulation Board Co.) (Fir-Tex)	St. Helens, Oreg.
Flintkote Co. (Flintkote Stalwart)	Meridian, Miss.
Pioneer Div., Flintkote Co. (Flintkote Pioneer)	Hilo, Hawaii
Homasote Co. (Homasote)	Trenton, N. J.
Insulite Div., Minnesota and Ontario Paper Co. (Insulite, Bildrite)	International Falls, Minn.
Johns-Manville Corp. (J-M Insulation Board)	Jarrett, Va.
Johns-Manville Corp. (J-M Insulation Board)	Natchez, Miss.
Johns-Manville Corp. (Under construction) (J-M Insulation Board)	Klamath Falls, Oreg.
Mac Andrews and Forbes Co. (Lockaire)	Camden, N. J.
National Gypsum Co. (Gold Bond)	Mobile, Ala.
U. S. Gypsum Co. (plant owned and formerly operated by Oregon Fiber Products Co.)	Pilot Rock, Ore.
Simpson Logging Co.	Shelton, Wash.
Southern Pine Lumber Co. (Under construction)	Dibbol, Tex.

Conversion Factors and Equivalents

LENGTH	1 centimetre	=	0.3937 in.	1 inch	=	2.54 cm.
	1 metre	=	3.281 ft.	1 foot	=	0.3048 m.
AREA	1 sq. metre	=	10.764 sq. ft.	1 sq. ft.	=	0.0929 sq.m.
VOLUME	1 litre	=	0.2642 US gal.	1 US gal.	=	3.785 litres
	1 m^3	=	35.31 cu. ft.	1 cu. ft	=	0.028323 m.
WEIGHT	1 kilogramme	=	2.205 lb.	1 pound	=	0.4536 kg.
	1 metric ton	=	1.1025 short tons	1 short ton	=	0.9072 m. tons
					=	2000 lb.
PRESSURE	1 kg. per cm^2	=	14.225 lb. per sq. inch	1 lb. per sq. inch	=	0.07031 kg. m^2
DENSITY	1 kg. per m^3	=	0.06243 lb. per cu. ft.	1 lb. per cut. ft.	=	16.02 kg.per m^3
ENERGY	1 kilowatt	=	1.341 h. p.	1 horse-power	=	0.7457 kw.
THERMAL CONDUCTIVITY	1 Kcal./hr/m^2/deg C/m. thickness	=	8.05 B. t. u./hr/sq. ft./deg F./in thickness	1 B.t.u./hr/sq. ft./ deg F./in. thickness	=	0.124 Kcal/hr/m^2/deg C/m. thickness
WOOD MEASURES	1 m^3 solid vol	=	0.392 cords	1 cord	=	2.55 m^3 sol. vol.
		=	1.422 m^3 gross vol.		=	3.62 m^3 gross vol.
	1 m^3 gross vol	=	0.703 m^3 sol. vol			
		=	0.276 cords			
	1 m^3	=	424 board feet	1000 board ft.	=	2.36 m^3
		=	0.214 standards		=	0.505 standards

DRAINAGE TIME (Freeness)

Canadian mls	Defibrator seconds	Schopper Riegler deg.
850	12	
825	17	
800	22	11
775	28	12
750	35	13
725	41.8	14
700	51	15
675	61	16
650	72	17
625	87	18

SPECIAL FACTORS

Insulation board:

1 metric ton of 12.5 mm (½") thickness = 300 m^2 (approx) = 3230 sq.ft. (approx)

Hardboard:

1 metric ton of 3.2 mm (⅛") thickness = 320 m^2 (approx) = 3440 sq.ft. (approx)

Particle board:

1 metric ton of ¾" with a density of 0.625 (39.1 lb. per sq.ft.) = 80 m^2 (approx) = 861 sq.ft. (approx)

FIRMS Designing and/or Engineering Wood Composition Board Plants or Processes

United States

American Defibrator Co., Chrysler Bldg., 405 Lexington Ave., New York 17, N. Y.

American Manufacturing Co., 2119 Pacific Ave., Tacoma, Wash.

Blaw-Knox Co., Chemical Plants Div., 930 Ft. Duquesne Blvd., Pittsburgh 30, Pa.

Bramco, Inc., 626 5th Ave., New York, N. Y.

Clinton Engineering, Wilton, N. H.

Chipcraft Corp., Morristown, Tenn.

Columbia Engineering Co., Cress Bldg., Corvallis, Ore.

The Dean Co., 666 Lake Shore Drive, Chicago, Ill.

Elmendorf Research, Inc., 322 W. Washington St., Chicago, Ill.

Industrial Development Corp., 3011 South Chandler St., Tacoma, Wash.

Johnson & Johnson, Engineers & Architects, 111 West Washington St., Chicago, Ill.

Miller Hofft, Inc., Box 8718, Richmond 26, Va.

William H. Rambo, Engrs., Loyalty Bldg., Portland 4, Ore.

Rust Engineering Co., 575 Sixth Ave., Pittsburgh 19, Pa.

Donald R. Seip Co., 420 Lexington Ave., New York, N. Y.

Thompson & Holmberg, Terminal Sales Bldg., Portland 5, Ore.

Timber Engineering Co., 1319 18th St., N. W., Washington, D. C.

U. S. Machinery Corp., 90 Broad St., New York, N. Y.

Washington Iron Works, 1500 6th Ave., S., Seattle 4, Wash.

Wilco Machine Works, Memphis, Tenn.

J. G. White Engineering Corp., 80 Broad St., New York, N. Y.

Wood Treating Chemicals Co., 5137 S. W. Ave., St. Louis, Mo.

Canadian Engineers

Dr. L. L. Schaefer, Metropolitan Bldg., Vancouver, B. C.

S. C. Rooney, Columbia Engineering Co., 16 E. Hastings St., Vancouver, B. C.

Sandwell & Co., 1500 W. Georgia St., Vancouver, B. C.

British Industry Expands

The British wallboard industry is expanding. An official of the British Building Board Manufacturers association recently stated that expansion programs now under way envolve the expenditure of more than two million pounds.

British Board manufacturers are trying to obtain some sort of protection against import of Swedish boards. British wallboard manufacturers state that the nationalized Swedish board industry can produce boards at lower cost than is possible in the United Kingdom. Production of hardboards in England was placed at about 25,000,000 square feet in 1952. Last year it was 56,000,000 square feet.

Imports of hardboard in 1953 totaled 189,000,000 sq feet. In 1955 imports totaled 434,000,000 sq feet but were down slightly in 1956.

• The use of horizontal wood siding is a good way to emphasize the low, long graceful lines of today's contemporary home, says the Southern Pine Association.

FPRS Program Features Particle Board

PARTICLE BOARD PRODUCTION was the principal program topic at the annual session of the Northern California Section of the Forest Products Research Society. The meeting, held in Berkeley, Calif., on May 2-3, drew nearly 150 delegates.

The program was arranged by N. T. Shelton, Diamond Match Co., and Dr. Fred Dickinson, Forest Products Laboratory, University of California. Presiding over the meeting was N. H. Stephenson, Sacramento Box & Lumber Co., chairman.

Highlights of the discussions:

NEW OFFICERS and trustees of FPRS, Northern Calif. Section. From left, Peter Field, Ivory Pine Co., newly elected sec.-treas.; H. N. Stephenson, Sacramento Box & Lumber Co., outgoing section chairman; N. Thomas Shelton, Diamond Match Co., chairman; Robert M. Kuhn, Rees Blow Pipe Mfg. Co., vice-chairman; Byrne Manson, Simpson Logging Co., trustee; Ralph H. Bescher, The Koppers Co., Inc., Pittsburgh, Pa., nat'l pres. FPRS; Ray Berry, Scott Lbr. Co., regional board member; Dr. Fred Dickinson, Forest Products Lab., U. of Calif., trustee.

Operation Economics

(Donald R. Seip, Donald R. Seip Co., New York)

Much experience has yet to be gained in the manufacture and particularly the marketing of particle board, medium density board. Many raw materials now being used could better be used in other products than in medium density board.

Properties of the finished product must be determined in advance of plant erection and the product must be competitive in price.

Some boards being manufactured today are not suitable in competition or quality. Present market is for a high grade board that has all the properties necessary to meet the requirements of the market.

Cost of entry into the field. An economic unit plant should produce about 100 tons of board per shift, and should cost about $3,500,000. There are no short cuts to the basic steps in planning, and the many items of equipment to purchase and install.

Good medium density board must sell at the plant for around 20c per sq. ft. to return to the manufacturer a reasonable profit.

There is nothing to indicate that good quality medium density board can be manufactured more cheaply abroad than in the United States. Costs abroad and in the United States may vary greatly in certain details but the total cost won't vary much.

Medium density board can be produced in the United States at about 350 sq. ft. per man hour on a ⅜ths inch basis, which compares favorably with cost of producing Douglas fir plywood.

Developing a marketing program is one of the most important aspects of a medium density board manufacturing business. A skilled sales force that knows what it is selling is imperative.

Manufacturers of medium density board should cooperate to raise the quality of their product.

Mr. Seip predicted that medium density board will replace plywood.

Raw Materials Available

(L. N. Erickson, USFS, Calif. Range & Experiment Station)

The Calif. Range & Experiment Station has found northern California contains a large volume of raw materials suitable for particle board manufacturing. There were about 370 million cu. ft. of residues developed in primary plants in California in 1952. These consisted of 242 cu. ft. of coarse residues (chippable) and 128 cu. ft. of fine (½ shaving and ½ sawdust). Of this amount 162 million cu. ft. of coarse residues were not used, and 66 million cu. ft. of fines were not used.

Sawmills produced 97% of residues and plywood plants 3%. So far particle board manufacturers do not face competition for the so-called fine material, shavings and sawdust. They represent substantial percentages of the log volume.

Logging or woods residues are estimated to have a potential volume of some 160 million cu. ft. annually.

Bark might be a potential source of raw material.

Measurement of Sawmill Chip Yield

(N. T. Shelton and Henry Sandstrom, Diamond Match Co.)

Log size-dia. of logs sawn by mill is an important factor in determining the over-all chip yield. Logs averaging 10" dia. will contain approximately 1¼ units of chippable residue per M net log scale as compared with only ¼ units per M for logs of 50" dia.

Adhesive and Adhesion Problems

(J. E. Marian, Forest Products Laboratory, University of Calif.)

Suggested need for more research to reduce excessive cost of binder in particle board. Approximately 5-10% binder equals the cost of 90-95% wood particles in the finished board. Spreading the binder is most critical and most decisive operation for quality board next to mechanical preparation of chips and shavings.

Progress in adhesive application in particle board, combined with improved chip preparation, ought to be along the following lines:

- Production of chips with undamaged surface structure. Should be a slicing of wet wood rather than a cleavage.
- Distribution of the adhesive rather as a continuous film than as discrete droplets or lumps on the chip surface.
- Prevention of any undesirable penetration by properly chosen pressing cycle conditions, types of catalysts and if necessary through development of new adhesive processes.

Quality Control

(Warren C. Smith, U. S. Plywood Corp., Anderson, Calif.)

Described face tests, tensile shear tests, and screw holding power test on Novoply.

Automation allows great portion of operators to become 100% quality control men. Assistant foremen have been assigned the job of quality control on their shifts. Assistant foreman takes direct measurements on many variables at various stages of manufacture of Novoply as well as supervising operators from a quality standpoint.

Data gathered is put on Shewart Control Charts. Quality Control Supervisor daily inspects and analyzes these charts and each month writes a quality control report which tabulates average values, average ranges, and various control limits so that a permanent record is available.

- A practical finish for Southern Pine boards and batten siding is obtained with a pigmented water repellent preservative. While not as durable a finish as paint, it is more easily renewed to retain the desired appearance.

LATHE OPERATOR'S controls. Lathe operator preselects with center dial next tray he wishes to use, then hits action button when veneer breaks, thus changing trays and position of tipple.

E. L. ENSLEY, chief engineer, points to air braker tipple used for breaking veneer. Two 1½" valves are mounted on either side of tipple with a small volume tank on each of the valves.

New Techniques in Veneer Plant

Semi-automatic devices simplify veneer breaking process, tipple operation and tray control.

SEMI-AUTOMATIC veneer breaking, tipple operation and tray control are used by the new Drain Plywood Corp. green end at Drain, Ore. The lathe operator has partial control of these functions with the rest of the control automatic. No tipple operator on the offbear end of the lathe is required.

Air pressure breaks the veneer, with two 1½-inch valves with small volume tanks attached doing the job. A pipe with a 3/8 x 1½-inch slot is attached to each valve with a pressure of 80 psi on the system. Two solenoids controlled by a button on the lathe operator's controls exhaust the valves simultaneously to break the veneer. Air is furnished through flexible rubber hose lines.

Veneer proceeds through the tray; when it reaches a point 20 feet from the end it hits a limit switch which flashes a warning light on the lathe operator's control board. This warns the operator to make certain he has the next tray pre-selected.

The veneer travels another four feet and hits a limit switch which triggers the veneer breaker on the tipple. The lathe operator then passes an action button which moves the tipple to his pre-selected next tray. When the valves are exhausted they make a loud report which the operator can easily hear.

Following the breaker switch, the veneer travels the final 16 feet on the tray, when it hits a third switch which deenergizes an air cylinder. This disengages the clutch and engages a brake on that particular tray, stopping it immediately.

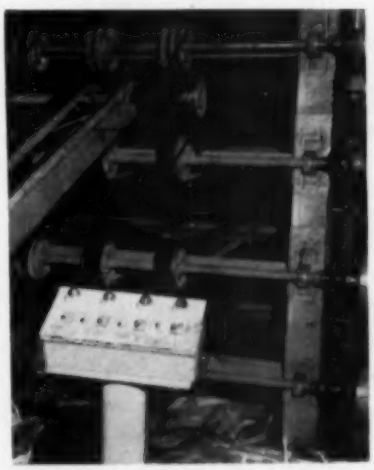
AN INTERLOCK IN THE SYSTEM prevents the clipper tippleman inadverdently starting a tray being filled by the lathe. The warning lights on the lathe opeartor's board also warn him against filling a tray being fed to the clipper.

A hydraulically operated tipple is in use between the trays and clipper feed table to minimize veneer damage when dropping down to the feed table. Three 8x8-inch cylinders are mounted in series on the back of the tipple for tipple movement between the four trays. Each piston rises up from the cylinder below it. Cylinders are operated by solenoids controlled from the tipple operator's controls beside the tipple. He also has switches triggering the solenoids engaging the clutches driving the trays.

ONE OF THE FEATURES of the plant is the chip conveyor and blower system installed by Rader Pneumatics of Portland, Oregon, The system operates with "Redco" electrical controls. The conveyor which feeds the chips into the chipper senses when the chipper has become loaded to its capacitl and stops automatically until the chipper has worked its way through any surge in loading and until it is working below its rated horse-

(*Continued on page* 152)

HYDRAULIC TIPPLE controls for the clipper. The 8 x 8½-inch cylinders are mounted in a series which operates on 80 pounds psi.



TIPPLE ON off-bear end of trays and feed end of the clipper Solenoids, at right, control clutch and brake action on the trays.

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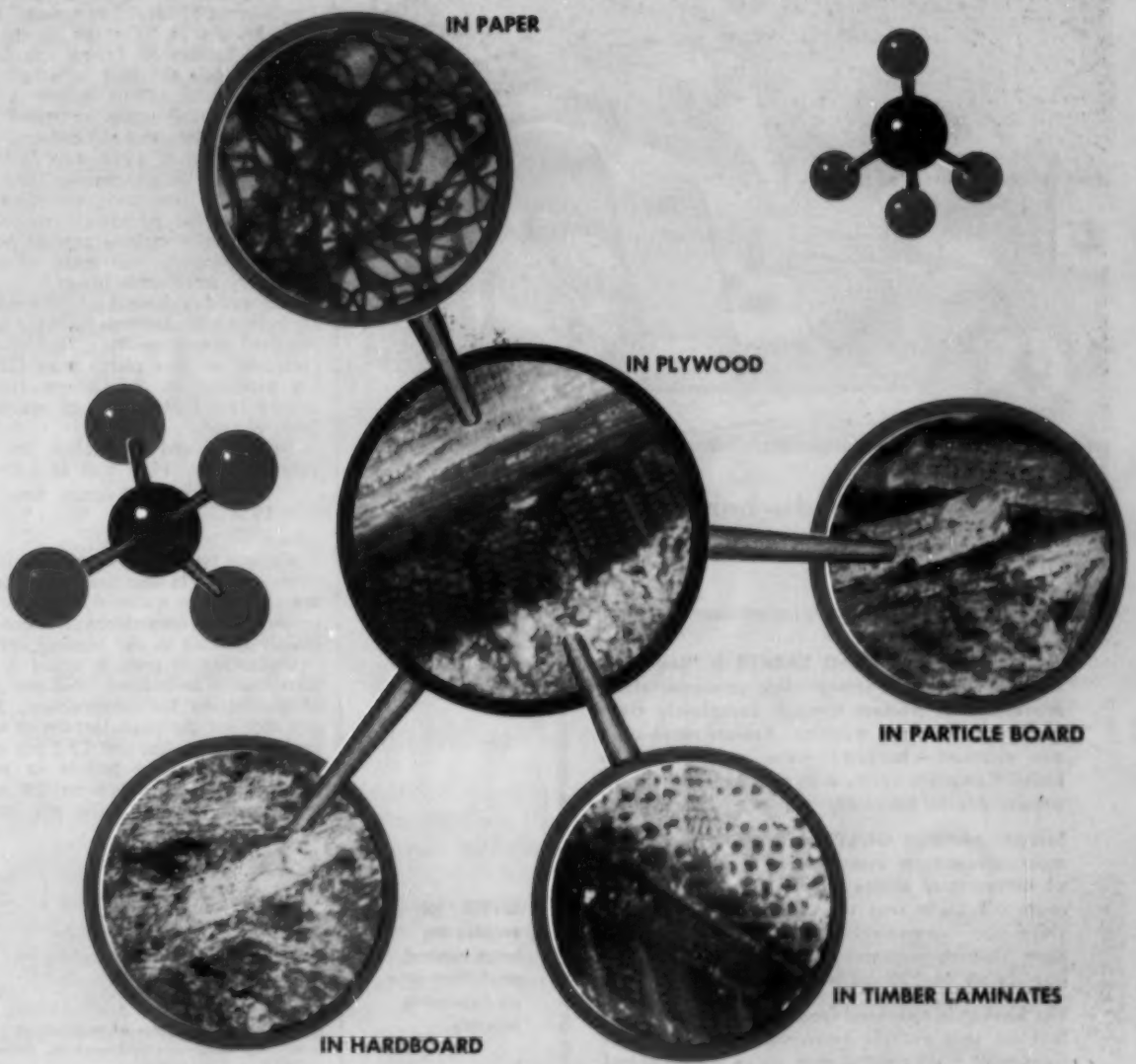

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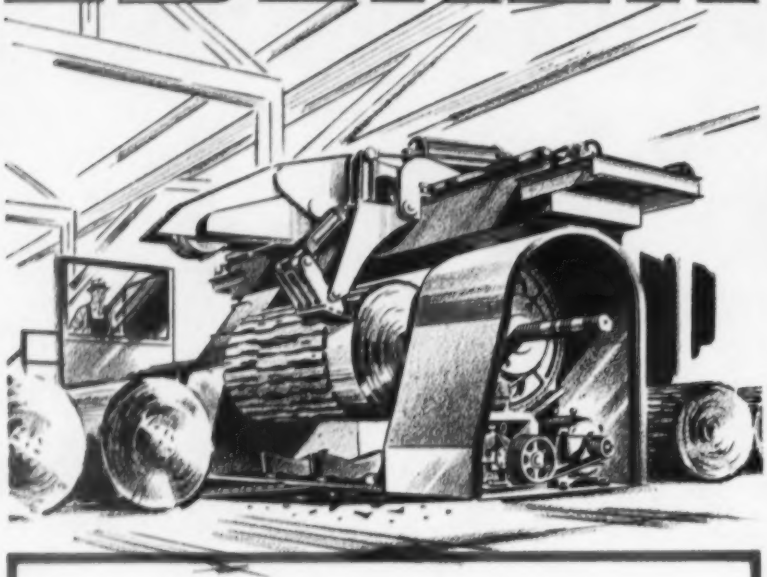

Peelers chucked—barked—and on way to lathe—in as little as 45 seconds!

The EDERER OVERHEAD BARKER is "job-engineered" to permit straight-line conveyor chain movement of peelers through completely clear floor area beneath machine. Peelers move up—are chucked—barked—move on through to lathe. Complete cycle, with average 36-inch diameter peeler, takes approximately 45 seconds!

Scraper removes ONLY the bark, assuring the most veneer from every peeler; handles peelers of almost any shape or contour. Rosser head routs off burls and unusable wood. The machine handles peelers from 110-inch to a minimum 12-inch diameter; can be built to handle peelers up to 135 inches long.

The barker is operated from one set of controls located wherever is convenient for operator. Conveyor chain control may be in same control station.

Floor-mounted barker is also available. Write for full information about both models.

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Board Industry in Japan

By
YASUMASA YONEZAWA

Mr. Yonezawa is Chief, Pulp Fibreboard and Chipboard Section, Gov't Forest Experiment Station, Ministry of Agriculture & Forestry, Meguro, Tokyo, Japan

PARTICLE BOARD WAS FIRST PRODUCED in Japan in 1950, by the Nippon Musical Instruments Mfg. Co.; known as "Yamaha Board," it was manufactured from specially formed wood shavings with an albuminous binder. This board is still being produced using improved and more up-to-date techniques.

At the end of 1953, two factories utilizing the "Homogenholz" process, and in 1955 one using the "Suntex" process started production. Now, seven factories making particle board are in operation, but three of these have very small scale plants.

The woodworking machinery industry in Japan is unable to meet the high-standard requirements of the newest factories, so that plants manufacturing products on the international grade level must import machines from abroad.

Particle board production for the years 1953 to 1955 was as follows:

1953	700	metric tons
1954	3,400	" "
1955	5,400	" "

Various types of low grade residues from sawmills and veneering plants are used as raw material; domestically produced urea formaldehyde resins are mainly utilized as the binding agents.

Utilization of particle board is approximately as follows: 35.6 per cent of production for construction, 35.1 per cent for the manufacture of sewing machine tables, and 22.2 per cent for furniture. The boards in most popular demand are 6 to 25 mm. thick and have a specific gravity of 0.6 to 0.8 g/cm.³

The Particle Board Industry in Europe

By
W. KLAUDITZ

Mr. Klauditz is Director of Institute of Holzforschung, Braunschweig-Brunswick, Germany

The particle board industry in Europe on a commercial scale was first started in Germany in 1941. From 1946 to 1950 further progress was made by this industry in general, especially in the Federal Republic of Germany, in the United Kingdom and in Switzerland. The years since 1951 have brought a rapid development of the particle board industry in the various European countries, since it has been utilizing forest residuals and industrial residuals as raw material.

Belgium, Germany, France, the Netherlands and Sweden have also

(*Continued on page* 83)

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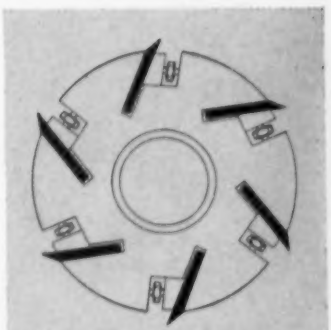
Uniform in thickness and perfectly balanced in weight, toughness and resistance to abrasion, Simonds Thin Planer Knives are mated "teams of precision" . . . knives that meet today's needs for surfacing lumber smoother, faster and at lower cost.

Heat treating of Simonds own steel in automatically controlled furnaces maintains uniform hardness — "locks in" the sharpness of the cutting edge — provides the shock resistance which pays off in fewer knife changes and less down time. Knives made like these can take the high heat of fast speeds and feeds, wear evenly like mated knives should, and resist nicking.

Yes, for smoother finished surfaces . . . for steadier production cutting, you'll be ahead with Simonds Thin Planer Knives . . . knives that come to you perfectly balanced and packaged in pairs ready for use.



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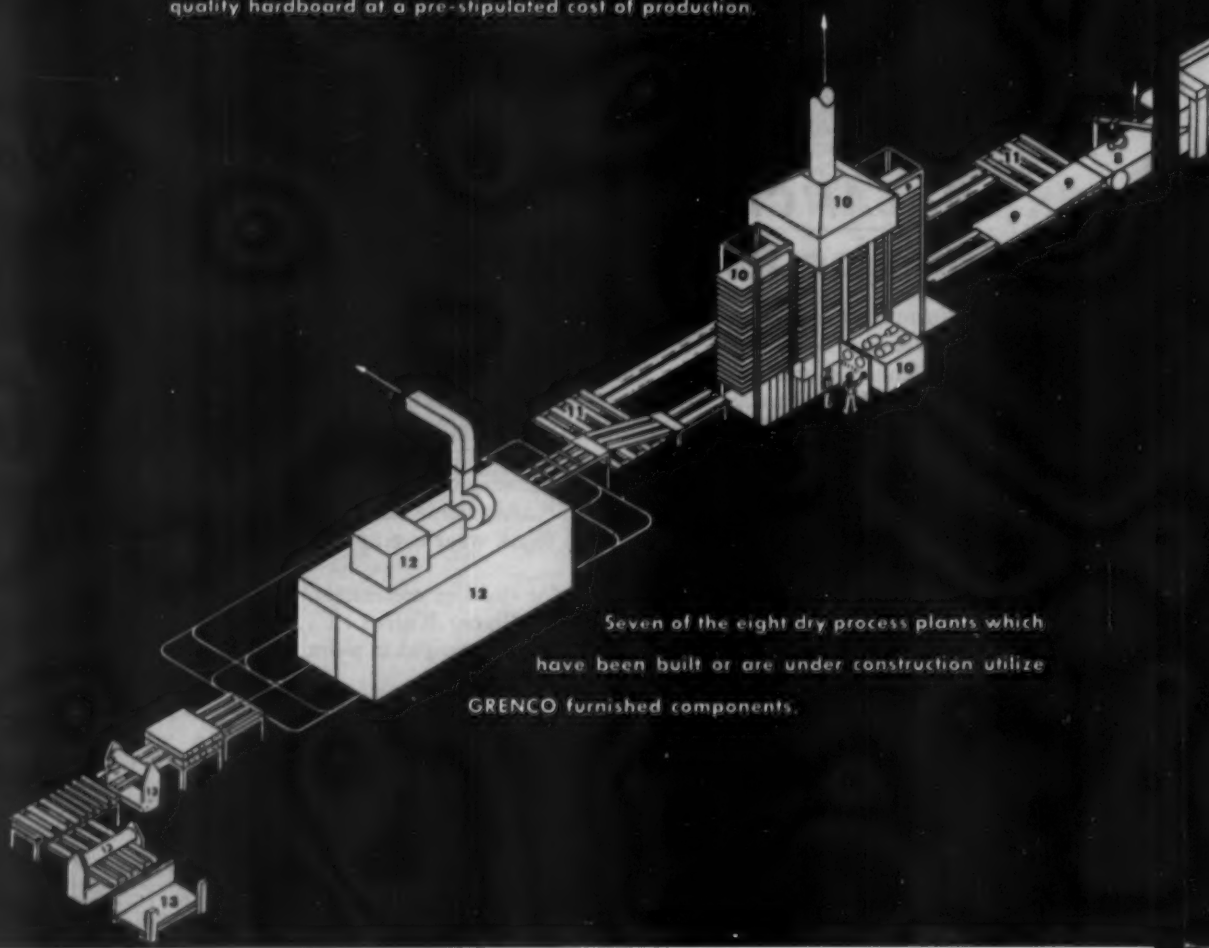
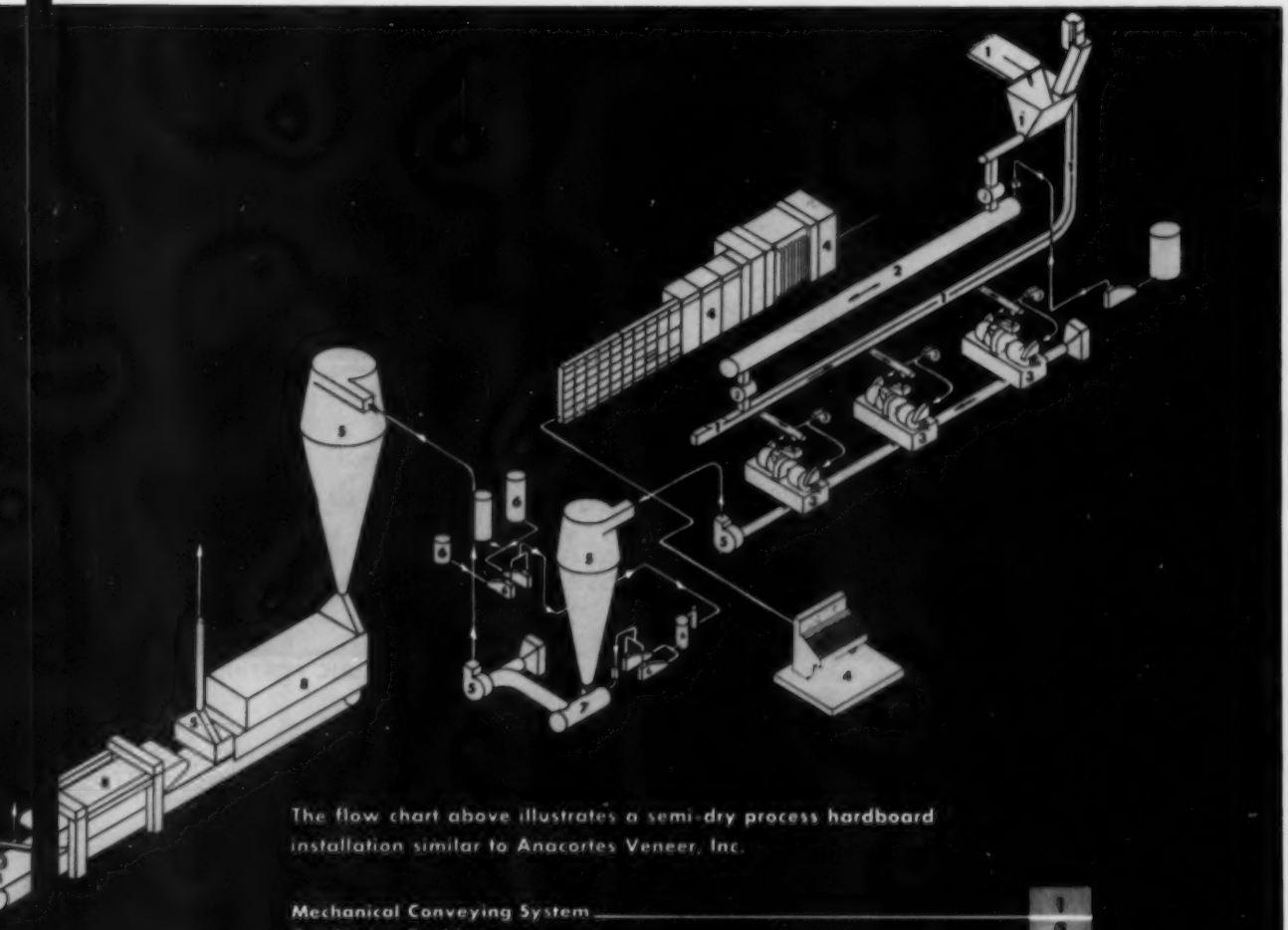
GRENCO can guarantee a plant to manufacture standard quality hardboard at a pre-stipulated cost of production.



Seven of the eight dry process plants which have been built or are under construction utilize GRENCO furnished components.



The flow chart above illustrates a semi-dry process hardboard installation similar to Anacortes Veneer, Inc.

Mechanical Conveying System	1
Continuous Cooking	2
Continuous Fiberization	3
Electrical Distribution and Control System	4
Complete Fibre Drying and Conveying System	5
Complete Chemical System	6
Continuous Blending	7
Mat Formation and Pre-compression	8
Mat Transportation System	9
Board Consolidation (Pressing) and Unloading System	10
Caul System (When Specified)	11
Hardboard Humidification	12
Hardboard Trim and Packaging System	13

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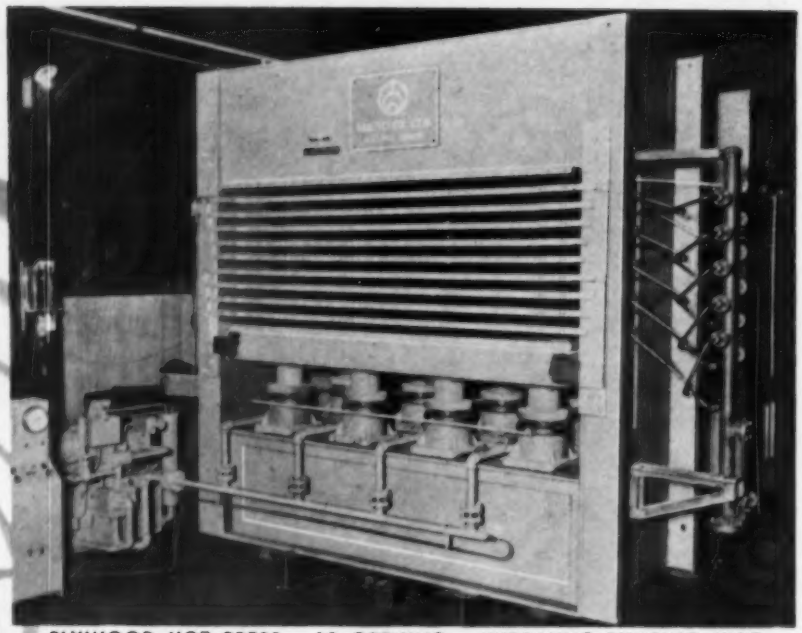

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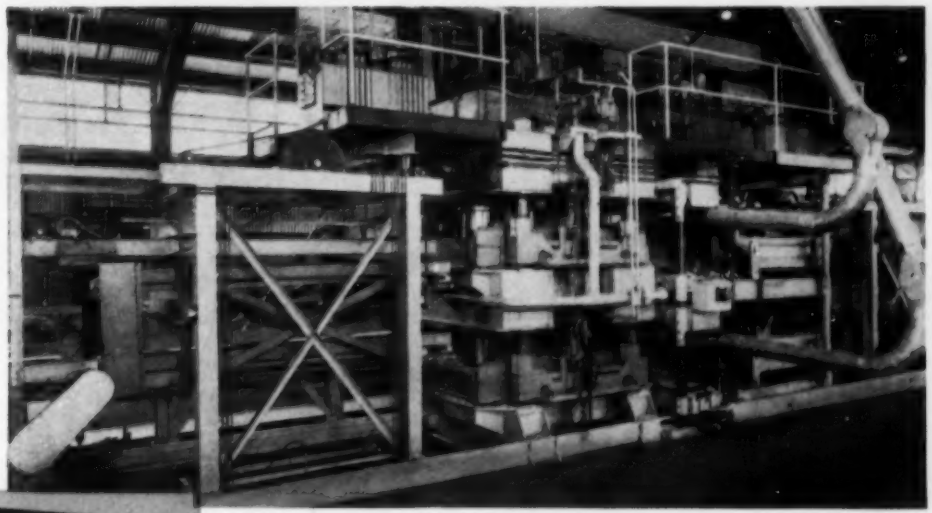
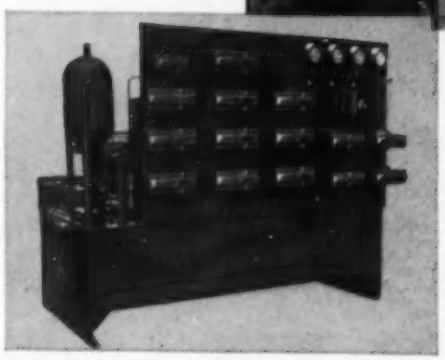


Prepress area of automatic hardboard plant designed and built as a package unit by the Industrial Development Company, Tacoma, Washington for Columbia Hardboard Company, Inc.

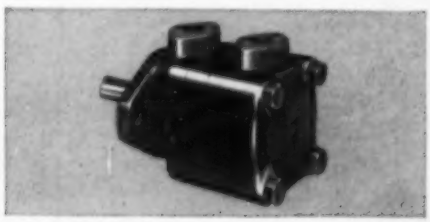
Reported to be the most highly automated in the wood products industry, this plant produces 60,000 sq ft of "Cedawood" per day (½" basis).

Seven Vickers Custom-Built Hydraulic Power Units play an important part in this performance; four are shown (in the photograph above) mounted on the platform directly above the prepress. The other three operate a series of automatic transfer systems in various parts of the plant. The transfer drives also use Vickers Vane Type Hydraulic Motors, which provide easily controlled variable speed for synchronizing various operations and for overload protection.

The use of hydraulic variable speed drives makes it easy to vary production rate, flakeboard thickness (⅛" to 1"), and type of product. Additional features are: accurate control, simplicity of installation, and low maintenance. For further information about the many benefits you get from Vickers Hydraulics, ask for Bulletin 55-67.



This Vickers Custom-Built Power Unit is individually designed to meet specific needs. It assures dependable performance, improves and simplifies design, reduces installation time and cost, and makes servicing easier. Write for Bulletin 52-45.

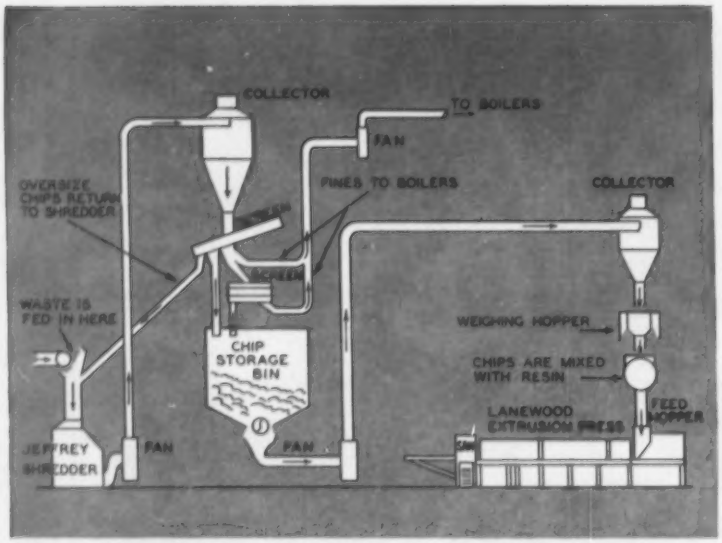


The performance-proven Vickers Balanced Vane Type Hydraulic Motor is an economical, efficient, and compact means of providing variable speed rotary power. It can be used for reversing service and can be stalled under load without damage. Write for Bulletin 1&M-5103.

7834

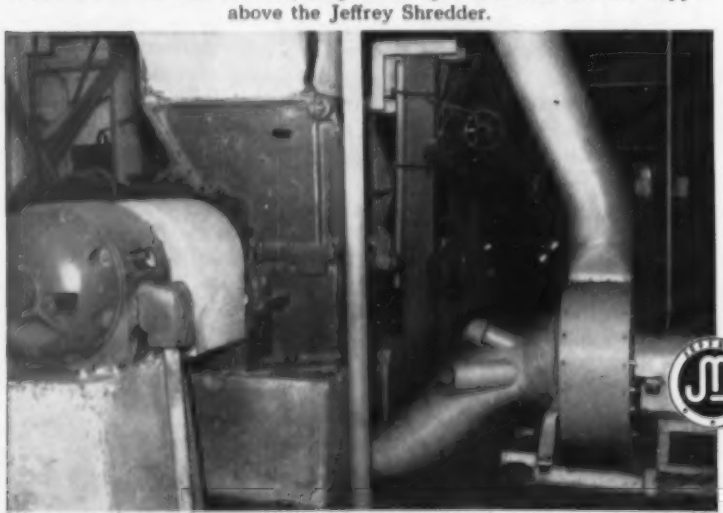
VICKERS INCORPORATED
DIVISION OF SPERRY RAND CORPORATION
Machinery Hydraulics Division
ADMINISTRATIVE and ENGINEERING CENTER
Department 1550 • Detroit 32, Michigan

Application Engineering Offices: **ATLANTA • CHICAGO • CINCINNATI CLEVELAND • DETROIT • GRAND RAPIDS • HOUSTON • LOS ANGELES AREA (El Segundo) • MINNEAPOLIS • NEW YORK AREA (Summit, N. J.) PHILADELPHIA AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) PORTLAND, ORE. • ROCHESTER • ROCKFORD • SAN FRANCISCO AREA (Berkeley) • SEATTLE • ST. LOUIS • TULSA • WORCESTER**
IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto and Montreal



Schematic layout for particle board production at The Lane Company, Altavista, Virginia.

Wood waste in various sizes, shapes and species is fed into the hopper above the Jeffrey Shredder.



Waste and oversize wood particles are reduced to proper size by this Jeffrey Shredder, then conveyed by air to an overhead collector, screens and storage.

SUITABLY SIZED WOOD PARTICLES—

a Jeffrey Shredder meets this requirement for **Lanewood Particle Board**

● Core stock employed in fine furniture by The Lane Company is made of suitably sized wood particles and a thermosetting resin. A proper mixture is forced, under pressure, between heated plates in a continuous extrusion press. There it is compressed and cured. The resulting board is quite economical to produce; it compares with wood in machineability, is uniform in dimension, and has high screw-holding power.

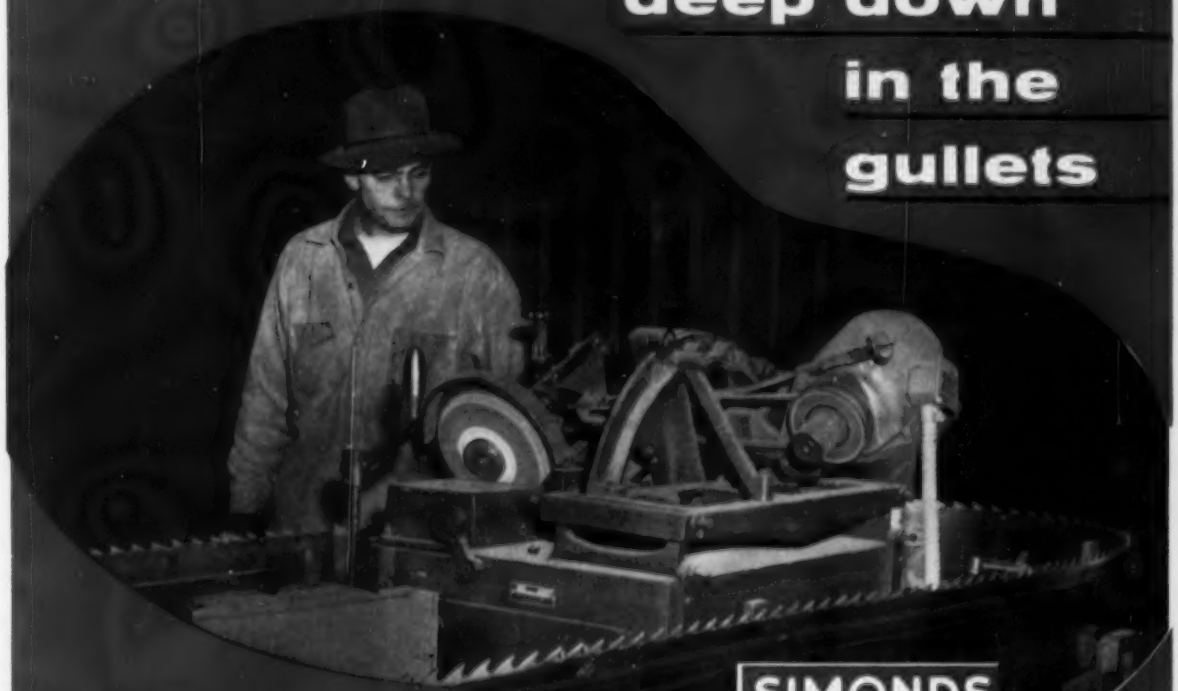
Jeffrey Shredders, Wood Hogs and Pulverizers can be supplied to satisfy all kinds of reduction problems. Available catalogs describing the machines will help you to choose equipment to meet your requirements. For your copies, write The Jeffrey Manufacturing Company, 911 North Fourth Street, Columbus 16, Ohio. 850

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT ... TRANSMISSION MACHINERY ... CONTRACT MANUFACTURING

Fast, cool grinding...

deep down in the gullets



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SAW GUMMING WHEELS

Keep your bands and circular saws in top cutting condition . . . with less re-sharpening. You can, with Simonds Saw Gumming Wheels. Fast cutting reduces grinding time. Cool action prevents burning and leaves a smooth, lasting finish. Complete line includes F face straight wheels and Type 13 saucer wheels for saw gumming . . . also straight wheels, cups, cylinders, segments and bolt inserted ring wheels for knife grinding. Order from your industrial distributor.

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Tacony & Fraley Sts., Philadelphia 37, Pa.

DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCHES: PHILADELPHIA, CHICAGO, DETROIT, LOS ANGELES, SAN FRANCISCO, PORTLAND, ORE.

AUTOMATIC TROUT SETWORKS

SAWYER CONTROLLED
FAST—ACCURATE—MECHANICAL

The TROUT SETWORKS has always set the ACCURACY standard for the sawmill industry. KLAMATH MACHINE & LOCOMOTIVE WORKS, INC. now has designed sawyer operated, automatic remote controls for the KLAMATH ANTI-FRICTION BEARING TROUT SETWORKS. This has been accomplished with no alteration whatever in the mechanical principles which give the TROUT SETWORKS its unfailing accuracy.

NOTE THESE FEATURES

1. *Complete sawyer operation.*
2. *Trout accuracy maintained to .015"*
3. *Setting speed maintained.*
4. *Automatic operation reduces wear on parts.*
5. *Maintenance is simple.*

Representatives in Washington, Montana and Northern Idaho: AIR MAC, Inc., 3838 Fourth Avenue South, Seattle 4, Washington, and AIR MAC, Inc., E. 3710 Trent Avenue, Spokane 10, Washington. In Arizona: Arizona Mining Supply Company, Prescott, Arizona.

KLAMATH MACHINE & LOCOMOTIVE WORKS INC.

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Look for the Indian Head on all **KLAMATH MACHINE** *products*

Export Division: **FRAZAR & HANSEN, Ltd.**
301 Clay Street, San Francisco 11, California, U. S. A.

354-1 and 448 are self-aligning

The GRAPHALLOY Process was patented 42 years ago and the name GRAPHALLOY has been our registered trade mark since that time. While this company has been selling GRAPHALLOY for the past 42 years, recent developments have added materially to its properties.

OPERATE DRY to Temperatures of 700° F.

BOARD OVENS – Copper-GRAPHALLOY General Purpose Hanger Assembly 354-1 was designed especially for roller-type board ovens. Copper-GRAPHALLOY is used primarily because of its long life, eliminating shut downs for greasing and maintenance. Astonishing savings in avoiding loss of production have resulted from the installation of these hanger assemblies in place of ball bearings since Copper-GRAPHALLOY Bushings have a normal life in this service of five to ten years without replacement.

VENEER OVENS – Copper-GRAPHALLOY Bushing Assembly 448 was designed especially for the usual veneer oven bearing. It replaces the present ordinary grease-lubricated roller . . . *and eliminates shut downs for greasing.* These Copper-GRAPHALLOY Bushings have run continuously 24 hours per day seven days per week *for ten years* without any down time.

REFUSE BURNERS – Copper-GRAPHALLOY Bushings have been used for refuse burner conveyor bearings and pillow blocks at the hot end of the conveyor. Bearings have been in operation 5 to 7 years without replacement and without attention. *See our Data Sheet 478.*

GRAPHALLOY BUSHINGS cut maintenance costs in these ways:

• Have long life • Require no attention • Operate where oil or grease lubrication cannot be used • Avoid down time • Do not soften at high temperatures • Have high tolerance for dust • Withstand high temperature (700°F.) as in dryers, ovens, refuse burner conveyors, and in rotary steam joints.

Use GRAPHALLOY BUSHINGS For TROUBLE-FREE OPERATION in the following LUMBER MANUFACTURING EQUIPMENT:

DRYERS • BOARD DRYERS • PLYWOOD DRYERS • GLUERS • VENEER JOINERS • KILNS • KILN CARS • IMPREGNATING KILNS • PATCHERS • HOT PRESSES • REFUSE BURNER CONVEYORS • CHAIN IDLERS • SUBMERGED BUSHINGS IN LOG HAULS

USE OUR 42 YEARS OF BEARING EXPERIENCE!

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Please send me descriptive literature and Bushing Inquiry Form 107A.

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COMPANY _____

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Bradley Lumber Co. co-ordinates logging, milling, fire fighting with General Electric Two-Way Radio

Fire control savings alone far exceed cost of complete system. Immediate reporting of small forest fires and split-second communication with mobile equipment hold damage losses to a minimum for the huge Bradley Lumber Company at Warren, Arkansas. Without the instant control provided through G-E Two-Way Radio, delays might cause thousands of acres of valuable timber to be wiped out. Milton Henry, Bradley's Chief Forester says: "Our savings in fire loss, and perhaps in human life, resulting from co-ordination achieved through General Electric Two-Way Radio can only be calculated as tremendous."

Bottlenecks eliminated. Instant instructions to cutting and logging crews spread throughout hundreds of miles of wood insures Bradley the fastest, smoothest supplies of the right kinds of logs at the right time to meet hour-by-hour milling requirements. Equipment and manpower efficiency are increased, bottlenecks are eliminated, Bradley racks up real savings all along the line with General Electric Two-Way Radio.

On the air means "on the way". Bradley's General Electric Two-Way Radio system ties together mill office, wood camps, forester's trucks, log loaders, and fire plows. The advantages in control and efficiency are instant and far reaching. Learn how G-E Two-Way Radio can improve your operations. Your local General Electric Communications Counsellor will be glad to analyze your needs and advise how you may profit through better communication in your business.

For Sales and Service see "Radio Communication Equipment" in your yellow pages. Or, write: *General Electric Co., Communication Equipment, Section C4157, Electronics Park, Syracuse, N. Y.* In Canada: *C.G.E. Electronics, 830 Lansdowne Avenue, Toronto.*

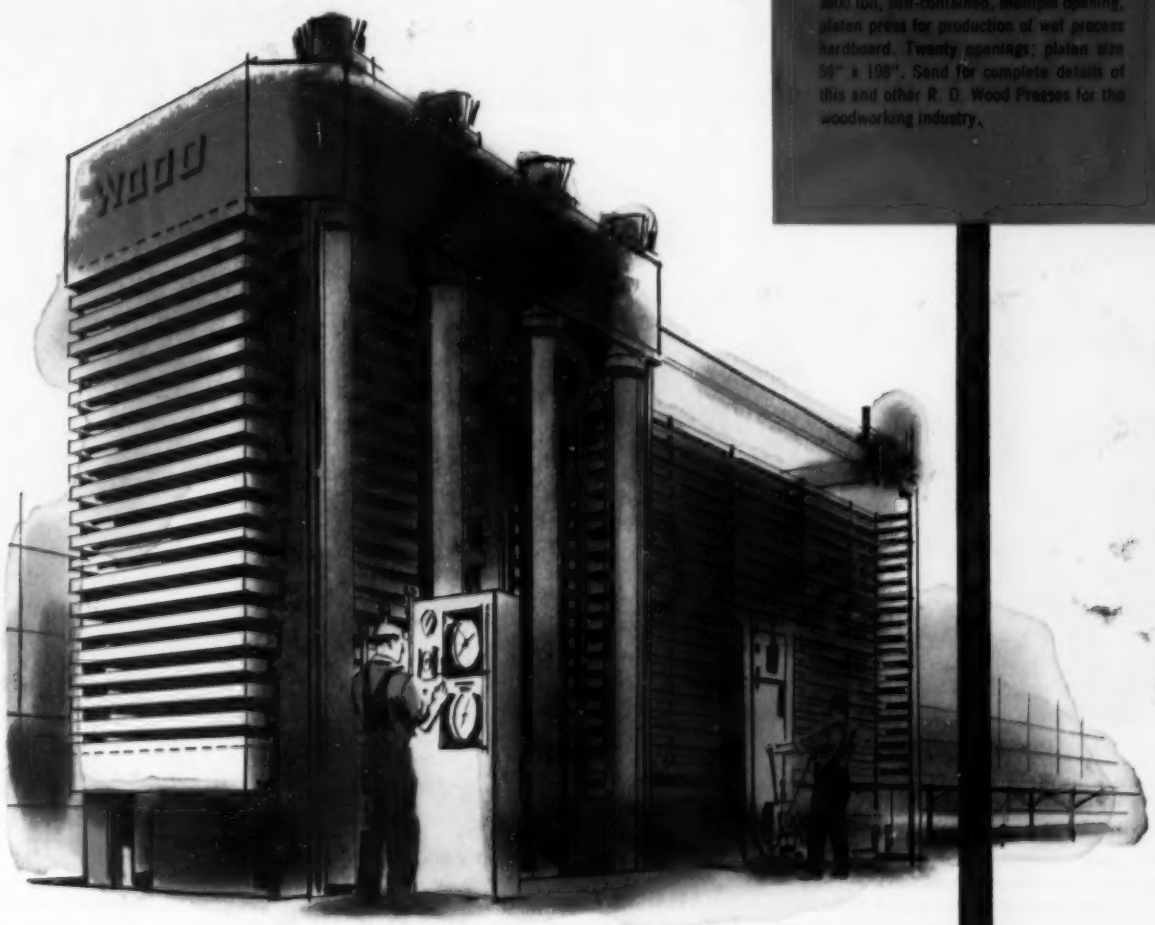
Progress Is Our Most Important Product

GENERAL ELECTRIC

There's always a job for a Wood Press . . . and a Wood Press to do the job

When you want a production shortcut—when downtime and costs need trimming—there's a job for a Wood Press. And in almost every type of woodworking operation, there's a Wood Press to do the job. R. D. Wood builds presses for producing hardboard, composition building boards, veneer, plywood and pressed wood—besides designing and constructing others for special work. All have three things in common: sound design, carefully selected materials, conscientious workmanship. As a result, R. D. Wood Presses consistently deliver the utmost in smooth, dependable performance; fast, economical production; trouble-free operation. Write for catalog and engineering information—without obligation.

3800 ton, self-contained, multiple opening, platen press for production of wet process hardboard. Twenty openings; platen size 54" x 198". Send for complete details of this and other R. D. Wood Presses for the woodworking industry.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

...multiplying manpower from receiving to delivery!

Put one operator aboard a Gerlinger material carrier and you have a team that continually chalks up new records for productivity . . . at savings that mount up, too. You multiply manpower with the payroll you have!

Mill owners moving thousands—or millions—of board feet monthly are finding it wise to standardize on Gerlinger mass-handling through every phase of operation from receiving to delivery. Profits gained have actually paid off the investment in less than a year.

It's features like these that make your choice of a Gerlinger a wise investment:

- Superior cab-to-road visibility
- 4-speed "Syncromesh" transmission
- Reserve-power overhead valve engine
- All-welded structural steel frame
- Smooth-riding helical coil springs
- 4-wheel power-assist brakes
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Get latest Gerlinger catalog and see why these "made to measure" carriers are the leaders. Address: Gerlinger Carrier Co., Dallas, Oregon.

Leaders for 38 years in building Fork Lift Trucks and Carriers

TOWMOTOR — GERLINGER

THE ONE-MAN GANG

Gerlinger Carrier Co., Dallas, Oregon, is a subsidiary of Towmotor Corporation, Cleveland, Ohio

European Particle Board

(*Continued from page* 70)

been processing flax straw for the manufacture of particle boards. Using the flat pressing process, the mills are chiefly producing three layer particle boards of different thickness, their density ranging from 0.5 to 0.75 g/cm³. These particle boards are chiefly used for furniture, interior work of buildings and houses and in other fields.

The particle board industry also uses the extrusion press technique. In 1956 there were 106 European particle board mills, producing approximately 724,000 m³. of particle boards. The particle board industry is rapidly expanding, so that in 1957 to 1958 its total production capacity is likely to rise to approximately two million m.³.

Foreign Reports on Board: JAPAN

Reported by U. S. Dept. of Commerce

There are ten companies in Japan now producing board. In another two years it is expected two more plants will be into production.

Production of board in Japan began after World War II, when several firms started using the wet method of manufacture to supply the demand of the Occupation forces stationed in Japan. The industry has since acquired various modern systems originated in the U. S. and Europe.

It is said that the Japanese hardboard industry is capable of utilizing modern imported machinery to produce a board on a quality par with other boards, including the U. S.

Six companies use the wet system, while four are using a dry system.

The annual gross capacity is a total of some 22,000 metric tons.

In Japan, most of the hardboard is consumed by the building industry and in the construction of furniture.

Sweden's Board Production

• Production of wallboard in Sweden has risen about one third in the last five years, according to information received from the Swedish Chamber of Commerce in the U. S. A. of New York. In Sweden, "wallboard" includes a variety of boards that are believed to be somewhat comparable to fibre building panels in the U. S.

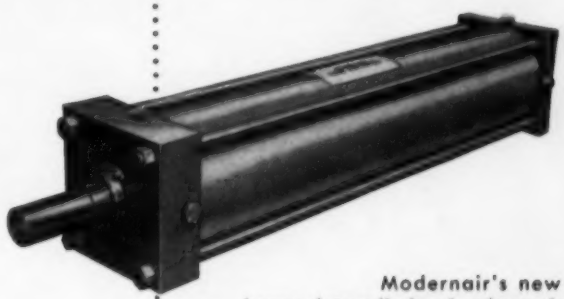
Following figures are in tons:

1951	328,000
1952	227,000
1953	270,000
1954	361,000
1955	424,000
1956	447,000

NEW

Modernair

HEAVY DUTY CYLINDERS



Modernair's new line of heavy-duty cylinders has been developed to meet the need for a rugged, reliable, long-lived cylinder under heavy mill-type service conditions.

They are offered in two types: the series HA for air service up to 200 psi; the series HH for hydraulic service up to 1000 psi. Both types are available in 3¼", 4", 5" and 6" bore sizes, stroke length optional.

CONSTRUCTION FEATURES

Rolled steel cylinder heads

•

Extra-heavy tie rod construction

•

Heat-treated, chrome-plated piston rod resists wear and corrosion

•

Self-adjusting, wear-compensating "Uneepac" seals on rod packing

Cartridge-type rod packing and gland seal assembly for easy servicing

•

High tensile aluminum alloy piston head, specially treated for corrosion and wear resistance

•

Needle-valve cushion adjustment – floating high durometer Hycar "O" ring type cushions on HA cylinders, tapered cushion bosses on HH cylinders

Modernair "ruggedized" cylinders and control valves can cut your maintenance expenses and downtime losses to the bone. Why not get the facts now? Write for catalog, specifications and prices . . . please address Dept._____.

Modernair CORPORATION

400 PREDA STREET Dept. K5

SAN LEANDRO, CALIFORNIA

28

MEMBER OF NATIONAL FLUID POWER ASSOCIATION

STEEL STRAPPING bundles logs into compact units, doubling storage pond capacity. *(Idea No. U6-8)*

STEEL STRAPPING packages hardwood doors for damage-free shipping. *(Idea No. S2-11)*

STEEL STRAPPING lumber into packages cuts loading, unloading time to minutes. *(Idea No. U2-2)*

AIM* for better handling, protection, storage

You can gain important materials handling, protection and storage advantages by applying Acme Steel unitizing and carload bracing Ideas to your operations. Safe, secure packages and shipments result in increased handling speed and labor-materials economies, bringing you important savings and greater customer satisfaction. It's easy to find out how.

Located near your plant is an Acme Idea Man thoroughly experienced in product protection for the forest products industry. He is immediately available to discuss your specific problems and provide hundreds of performance-proved Acme Steel Strapping Ideas, without cost or obligation. The seven Ideas on these pages are included among the Ideas-In-Action Reports your Acme Idea Man will be glad to show you. Among these many Reports—all of which have been developed from actual experiences of dozens of industries—are certain to be Ideas that can be applied to your problems, for better, faster, more economical product handling, protection and storage.

Your *Acme Idea Man can be contacted at the nearest Acme Steel Company office. Simply look under "Steel Strapping" in your classified telephone directory, or send the coupon for full facts and information.

ACME STEEL **STEEL STRAPPING**

ACME STEEL **STEEL STRAPPING** bundles flooring into secure packages for faster, safer handling. *(Idea No. S2-9)*

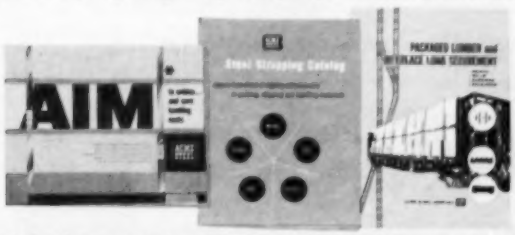
ACME STEEL **STEEL STRAPPING** packages and secures lumber for safer, faster shipment. *(Idea No. U2-1)*

ACME STEEL **STEEL STRAPPING** packages lumber for full utilization of mechanical handling equipment. *(Idea No. U1-11)*

ACME STEEL **STEEL STRAPPING** unitizes and braces plywood for carload movement. *(Idea No. U1-10)*

3 IDEA BOOKS

These three information packed Acme Steel Idea Books are available to you on request. They will provide dozens of clues to better ways to package and protect your products and plant output.



Write today for your choice of the above three Acme Steel Idea Books. Merely indicate the books you want on the coupon at the right and mail. Your request will be filled promptly, with no obligation.

Acme Steel Products Division
ACME STEEL COMPANY, Dept. LBU-57
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Please send me the new Acme Steel Idea Books I have checked below:

- ☐ **Steel Strapping Catalog** ☐ **Unitizing Catalog**
- ☐ **Packaged Lumber and Interlace Load Securement**
- ☐ **Have an Acme Idea Man call.**

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Sizes and Splits Plywood ...Plywood Specialties

Faster...More Accurately

GREENLEE
MACHINERY FOR
PLANING
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TENONING
MORTISING
BORING
SAWING

It's easy to maintain top quality and high production with this versatile machine. Sizes rough panels to width . . . splits them if desired . . . forms shiplap, and similar joints . . . all in one pass. Can also be arranged for scarfing panels or producing Texture 1-11 or other grooved panels. Automatic Transfer (shown here) moves panels to Greenlee Cut-Off Machine for square, true end-trimming.

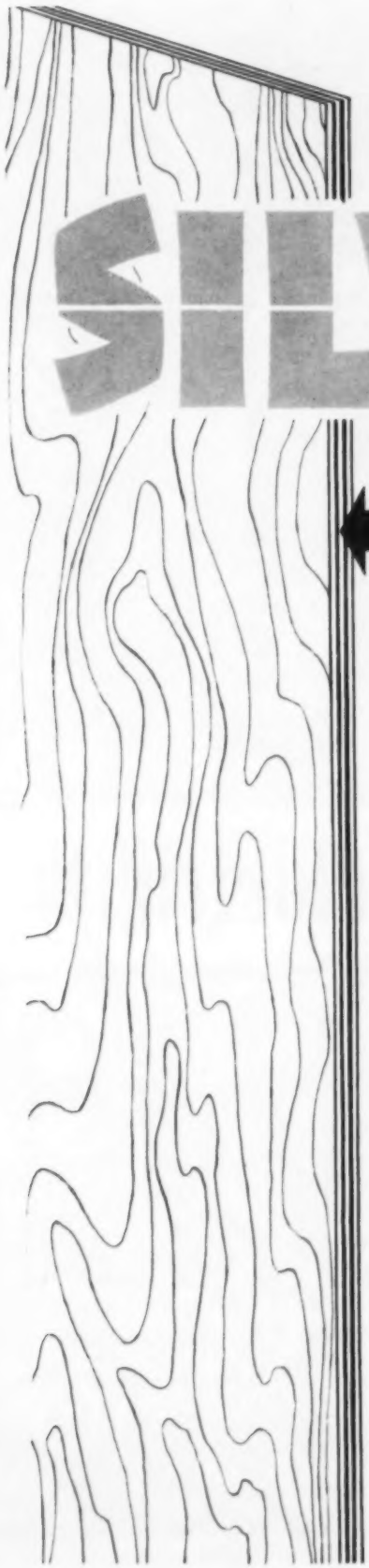
This installation is typical of the streamlined, efficient production which is achieved with Greenlee machines. Our representative will be glad to make recommendations for your plant. Write today.

Put a Profit in Your Woodworking With Greenlee Machines

WOODWORKING MACHINERY MANUFACTURERS' ASSOCIATION WMMA

GREENLEE BROS. & CO.

1865 TWENTY-FIRST AVE.
ROCKFORD, ILL.



BREAK-EVEN POINT TOO HIGH?

Investigate the savings offered by

SILVACON®

PHENOLIC RESIN EXTENDER

An *active* ingredient in the glue line

- HIGHER YEAR AROUND QUALITY
- LOWER GLUE LINE COST
- EXCELLENT SPREADABILITY
  — Saves core at the spreader
- LONGER ASSEMBLY TIME
  — Minimum dry-out
- FEWER "BLOWS"
- MORE TOLERANCE FOR STOCK VARIATION
- PROVED BY PERFORMANCE

Lower production cost and more dependable plywood quality are advantages offered by use of Silvacon. Together, they spell a lower break-even point, more profit and steadier sales to satisfied customers.

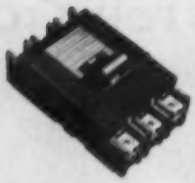
Active in the glue line, Silvacon helps form a bond of maximum strength. The glue spreads better, has minimum dry-out and greater tolerance for heat, moisture or other variations in the veneer.

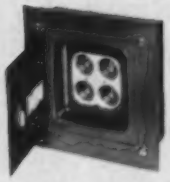
Test Silvacon in your plant now! Let us demonstrate its advantages . . . as proved by performance throughout the industry.

WEYERHAEUSER TIMBER COMPANY

Special Products Division • Tacoma 1, Washington

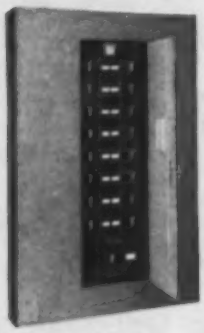
• Safety Switches and Industrial Circuit Breakers





• Fusible and Circuit Breaker Load Centers

• Voltage Testers



• Fusible and Circuit Breaker Lighting and Power Panelboards

• Power Distribution Switchboards and Switchgear

Wherever Electricity

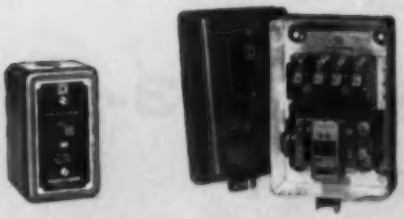
• Busways and Wireways

EC&M High Voltage and Synchronous Starters

• Special Purpose Control

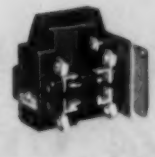
• Control Centers

SQUARE D COMPANY

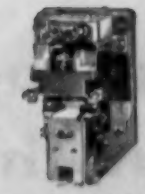


• A.C. Manual and Magnetic Starters

• Drum Switches



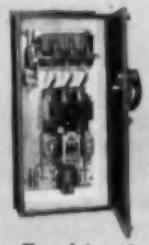
• Control Relays



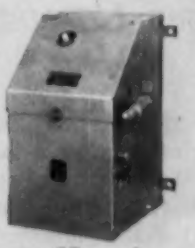
• Timing Relays

• Limit Switches

• Pushbuttons



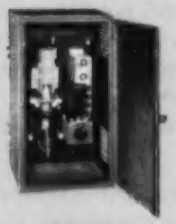
• Combination Starters



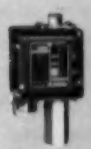
• Manual Compensators

• All Types of Reduced Voltage Starters

• D.C. Starters



• Electronic and Electro-Magnetic Welder Control



• Float & Pressure Controls for Pumps & Compressors

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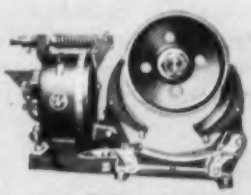

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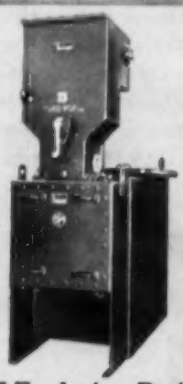
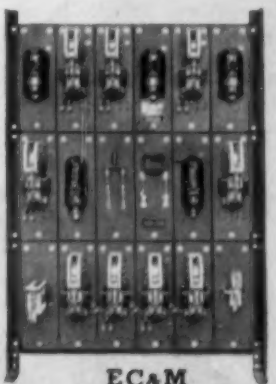


EC&M Explosion-Resisting Control for Petroleum Industry



EC&M Crane and Mill Control

DESIGN LEADERSHIP FOR MORE THAN 50 YEARS

Want to deck and reload logs for less?
Read how this Michigan Tractor Logger —

Outworks Old Equipment 3-to-1 —With 1/4 the Manpower

for Scott Lumber Company, Burney, California

"We use our new Michigan Model 175 Tractor Logger for about everything under the sun," grins Marion Adams, Operations Superintendent for this Shasta County (California) lumber company. "But mostly, it decks and reloads logs of ponderosa and sugar pine, incense cedar, Douglas and white fir. *One* man and our *one* Michigan now do the work it used to take *four* men and *three* pieces of equipment to do before!"

Handles 300,000 board feet per day

The busy Michigan pushes big logs off the trailers, then proceeds to sort them by species. Its hydraulic clamps will lift a log 6 feet in diameter—or several smaller logs. Forks can be raised as high as 11 feet 9 inches, tilted downward to reach over a stack to select one log for pick-up. The Michigan unloads and decks approximately 150,000 board feet per day—reloads 150,000 board feet per day—rain or shine!

Replaces miscellaneous machinery, shaves wage cost

Scott Lumber Company used to put four men, two crawler-type tractors and an A-frame on the heavy job of reloading trailers. Now, *one* man in the Michigan handles it with speed and efficiency. Michigan's four-wheel drive affords excellent traction, yet those big 23.5-25 tubeless tires don't tear up the decking area. No other mobile log handling unit can match the Model 175 for speed and maneuverability in the yard or on the highway (where the 27 mph unit occasionally goes to recover dropped logs).

Power train puts torque where there's work to be done!

The Michigan has proved especially easy to operate too. It has no engine clutch or pedal. Instead, two small power-shift levers on the steering column permit instant shifts between low and high, forward and reverse—even while moving in the opposite direction. Michigan's torque converter *automatically boosts torque up to 300%*, delivers it through the power-shift transmission to planetary-wheel axles. These axles concentrate full power on the *hubs*, take 70% of the torque *off* the shafts.

"Can't beat Michigan for safety, efficiency!"—Foreman

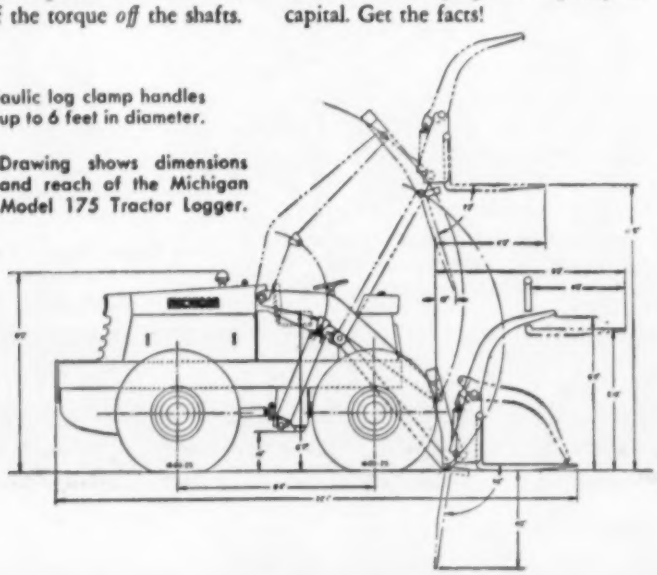
Foreman Asa Lakey, Jr., comments "You can't beat our Michigan Tractor Logger for ease and safety in log handling. With it, one man can do the job of *four*." Fred Ewer, Operator, finds it handles logs of all sizes easily—wheels around the decking area with no wasted effort—takes less than half an hour per day for fueling, lubrication, servicing and inspection.

Ask yourself this question:

Can you afford *not* to see what Michigan can do for *you?* All it takes is a call to your local Michigan Distributor. He'll be glad to arrange a demonstration *wherever — whenever* you say. No obligation, of course. Ask him about the wide variety of purchase plans available, too . . . including Clark's no-money-down, pay-as-you-profit lease-purchase plan. With it, you can put a Michigan Tractor Logger to work without laying out a penny of capital. Get the facts!

Hydraulic log clamp handles logs up to 6 feet in diameter.

Drawing shows dimensions and reach of the Michigan Model 175 Tractor Logger.



Michigan Model 175 Tractor Logger economically sorts and decks logs at Scott Lumber Company, Burney, California. Unit was purchased from Michigan's California Distributor, Buran Equipment Company, Oakland, Santa Clara and Norwalk.

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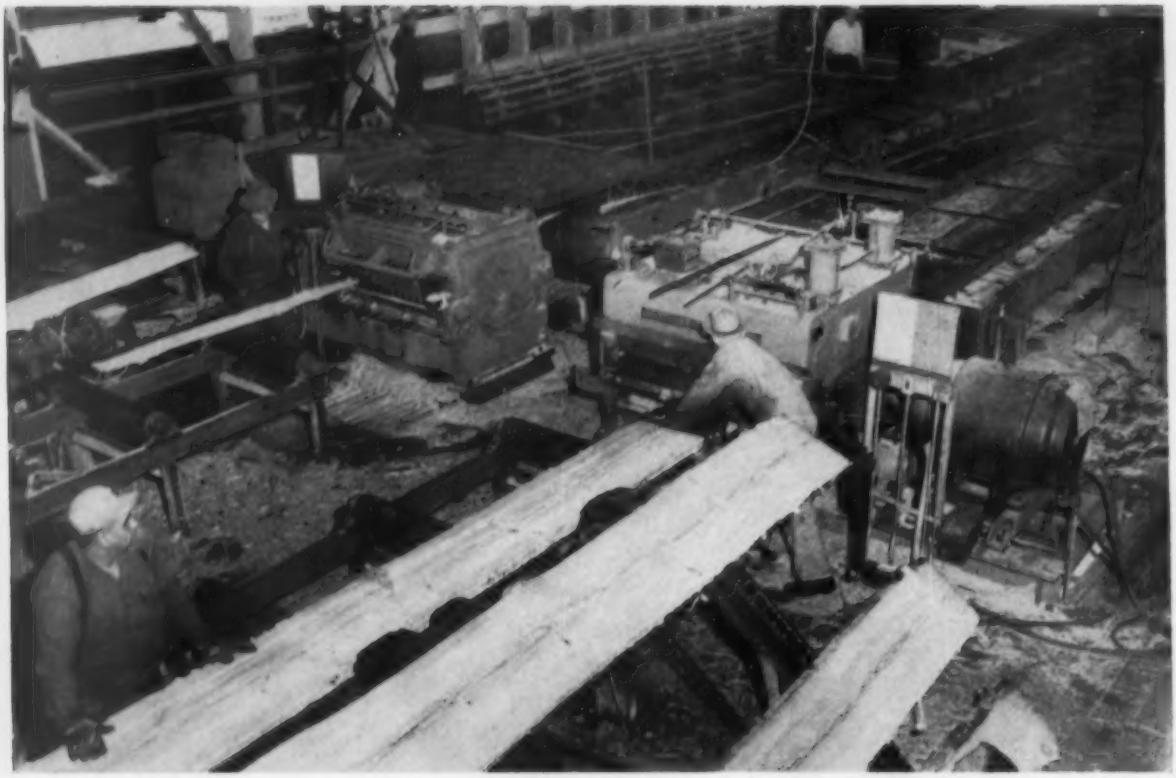

PORTLAND IRON WORKS Edgers in operation at POPE AND TALBOT'S, Port Gamble, Washington, plant. Standard Edger on left, Precision Edger on right.

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Engineered to exacting tolerance, designed with a preciseness found in the world's most *sensitive* machinery, PORTLAND IRON WORKS "Precision" Edgers are built to outlive your mill.

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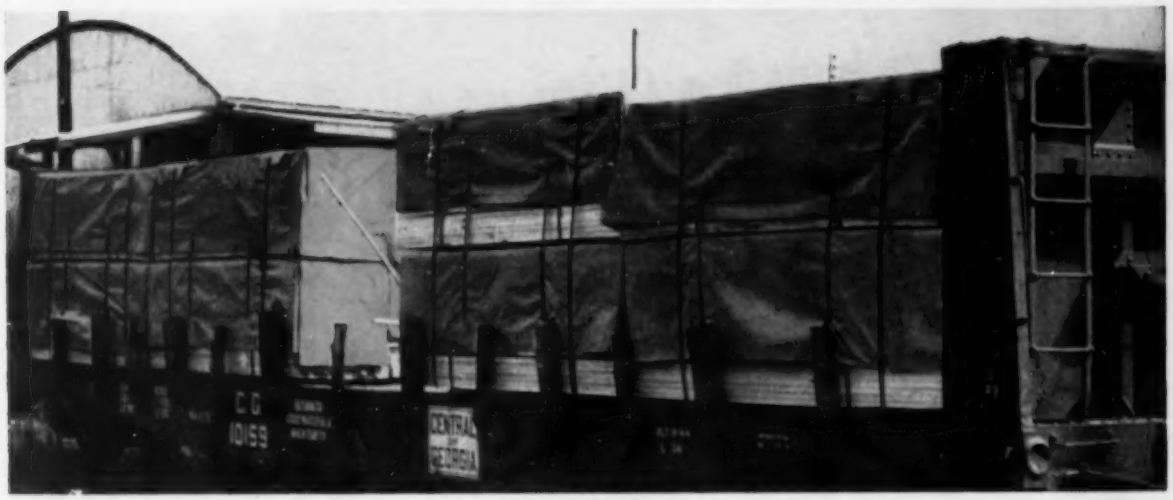

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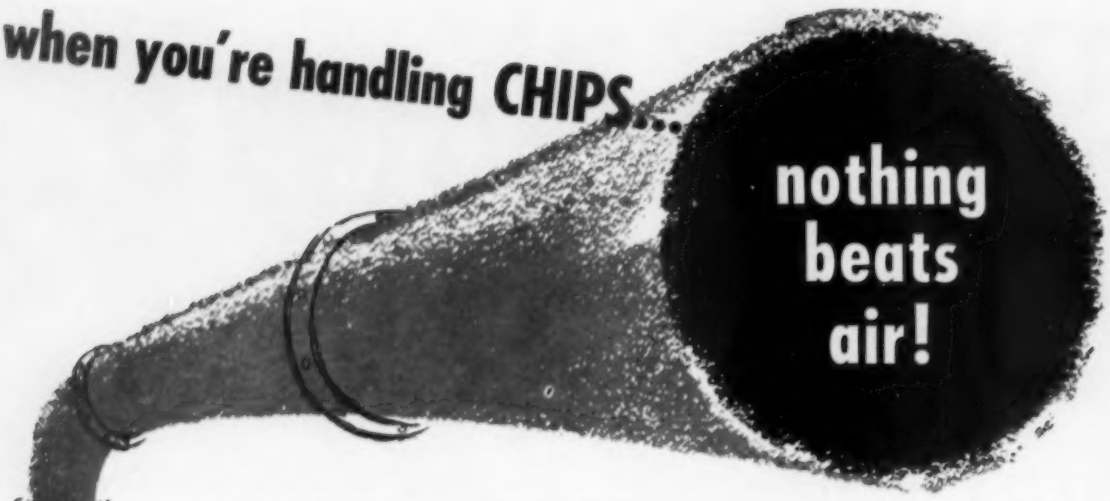

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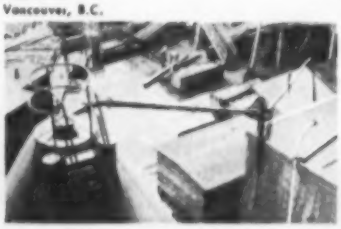

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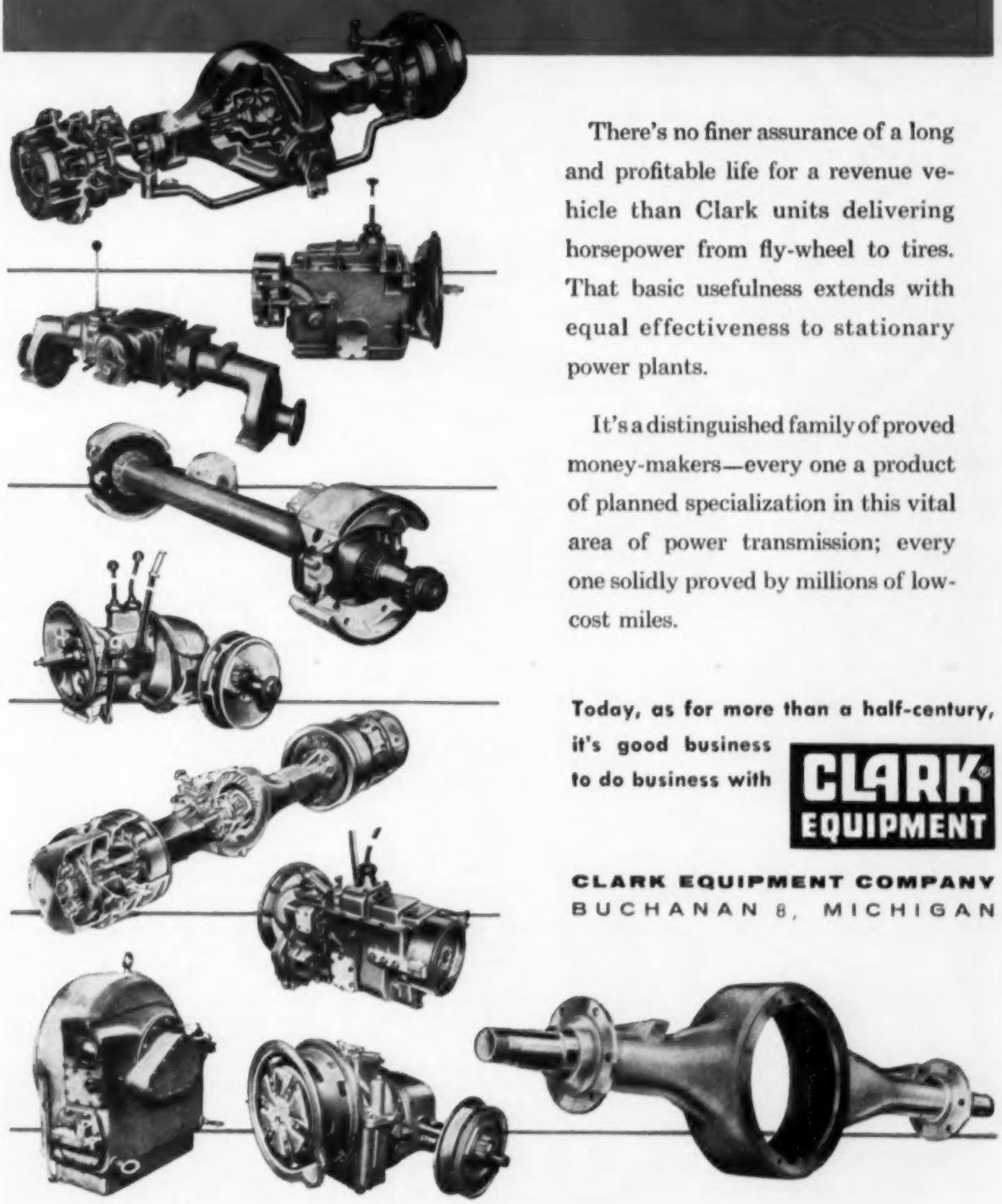

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Canada Conducts Board Research

By

J. H. JENKINS

WITHIN THE CONTINUING PROGRAM of research into all phases of board production, particularly from wood substance now discarded as residues from various conversion processes, studies and investigations have been carried out during 1956 at both the Ottawa and Vancouver Laboratories of the Forest Products Laboratories of Canada.

Particular attention has been paid to the availability of suitable residues for conversion to various types of board, and there has been a considerable overlap with the studies aimed at determining means of increasing utilization of mill residues for pulp chips. Necessarily, since many companies produce paper and board, it has been found that a great deal of the residue material processed to chips were found highly suitable for the production of paper.

It has long been realized at the Forest Products Laboratories of Canada that present conversion practices, more particularly at sawmills and veneer plants, turned out, as residuals, huge quantities of wood substance of which a high percentage was suited as raw material for the production of paper and board.

The Superintendent of the Ottawa Laboratory, Dr. H. Schwartz, attended the International Consultation on Insulation Boards, Hard Board, and Particle Board, convened at Geneva under the joint auspices of the Food and Agriculture Organization (FAO) of the United Nations and the Economic Commission for Europe (ECE). Participation in this and other forums has for aim keeping abreast of world developments, taking advantage of research findings elsewhere, and through close liaison avoiding unnecessary duplication of research work.

A report was prepared for publication as Bulletin No. 120, titled "Production of Wallboard from Wood Waste." This publication is now in the final stages of printing and should be available for distribution early in April.

Ottawa Laboratory

Recent work was concerned with the effect of the physical form of the raw material used in fibreboard production. Slabs and edgings, planer shavings, and coarse sawdust fractions of white pine were given a very mild chemical treatment and subsequently defibred in order to observe the degree of fibre damage in these materials. Fibres from planer shavings, as expected, were of a much higher quality than those from coarse sawdust. Chips from slabs and edgings produced normal pulps.

attrition mill in order to find the refining conditions leading to the strongest pulps. Pulps from slabs and edgings produced hardboards with a modulus of rupture of 6330 p. s. i. and a tensile strength of 3900 p. s. i. Pulps from the planer shavings produced boards with a modulus of 5340 p. s. i. and a tensile strength of 2890 p. s. i. The strongest boards produced from the coarse sawdust had a modulus of rupture of 3100 p. s. i. and a tensile strength of 1780 p. s. i.

In another study, western red alder was used. The specific aim was to determine the effect of fibre length distribution on the strength of hardboards. Several pulps with a wide range of fibre length distributions were prepared from water-soaked chips. Blends of these pulps were used to prepare experimental boards. Fibre length distribution in these pulps ranged from 46 per cent to 7 per cent, retained on a 14 mesh screen, and from 22 per cent to 1 per cent, passing a 200 mesh screen.

It was found that the pulps with the highest percentage of intermediate length fibres (those passing a 14 mesh and retained on a 200 mesh screen) produced the strongest boards. Further experiments have shown that improved strength properties are obtainable by a modified refining method. This involves passing the material several times through the refiner at a comparatively wide clearance with removal by screening of the intermediate length fibre fractions after each pass.

THE POTENTIAL USE of certain Eastern Canadian barks, e. g. spruce, balsam, fir, poplar, and jack pine, in structural boards was also studied. Although not generally considered as a source of fibre, most of these barks have been shown to contain an appreciable portion of fibre. Pulps produced from these barks have poor drainage properties and most of them have comparatively little strenth.

Defiberization studies were undertaken with laboratory equipment to provide basic information on the nature of the bark fibres, e. g. fibre length distribution at various degrees of freeness. Large differences were observed in the amount of energy required to refind the different barks to the same freeness values. It is intended to investigate the extent to which bark pulps can be incorporated into fibreboard furnishes.

A different approach to the bark utilization problem was also taken. This was based on the fact that most barks consist of two very different portions, i. e., the outer and the inner bark. Outer bark, in most species, is brittle and rather non-fibrous, whereas the inner bark is more fibrous and tough. By passing damp bark through a laboratory disintegrator (Rietz), it was possible to reduce it to a form which by screening could be separated into two fractions. The fraction retained on a ¼" screen was defibred.

It was found that pulps produced from this fraction had better board producing properties than pulps produced from the original barks. The fractions passing the ¼" screen were found to have a considerably higher alkali solubility than the whole barks. This suggests the presence of a higher percentage of phenolic compounds in the outer bark. These compounds are of special interest from the point of view of chemical utilization. One possibility for their utilization is in the production of resinous binder materials.

This will be attempted by activating and reacting these compounds with aldehydes. Some preliminary work on Douglas fir and western red cedar bark has indicated that it is possible to produce binders which, while not as strong as commercial resins, show promise as inexpensive extenders for particle board production.

Vancouver Laboratory

No special projects in board research were carried out at the Vancouver Laboratory during the past year. However, further attention was given to studies pertinent to the occurrence of residuals and the suitability of such wood substance for manufacture to pulps and boards.

New laboratory buildings are now being constructed at both Ottawa and Vancouver, with occupancy expected in late 1958 and 1957 respectively. Programming of future work at both laboratories is being based on the greater facilities that will be available, and high on the list of priorities are all studies aimed at determining methods and techniques which would reduce the incidence of waste during processing and permit a greater economic utilization of discarded wood substance. In this latter field the production of boards will continue to be an important avenue of research.

Board Testing Procedures

"Recommended Testing Procedures for Wood Particle Board" have been released by the National Woodwork Manufacturers Association. The publication covers suggested methods for sampling and testing wood particle board. Sixteen tests are outlined in the book. The recommended testing procedures were prepared by the Wood Particle Board Committee of NWMA for the purpose of assisting the industry in correlating research and testing of particle boards. Copies may be purchased from the National Woodwork Manufacturers Association, Chicago, Illinois at 50c each.

Mr. Jenkins is Chief, Forest Products Laboratories of Canada, Div. of Forestry Branch, Dept. of Northern Affairs and National Resources, Ottawa, Canada

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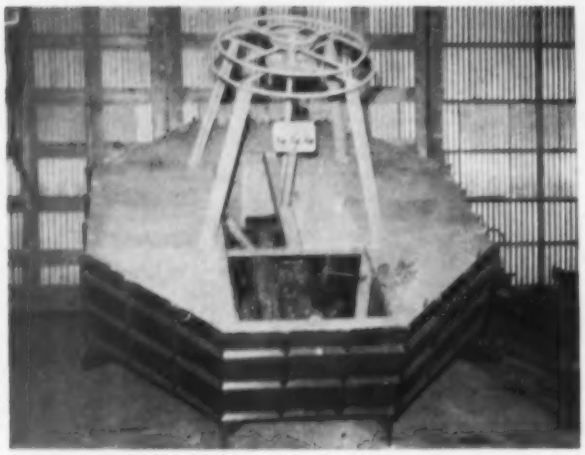

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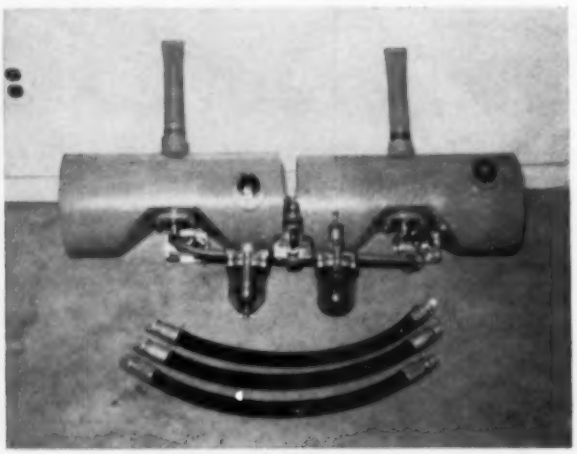

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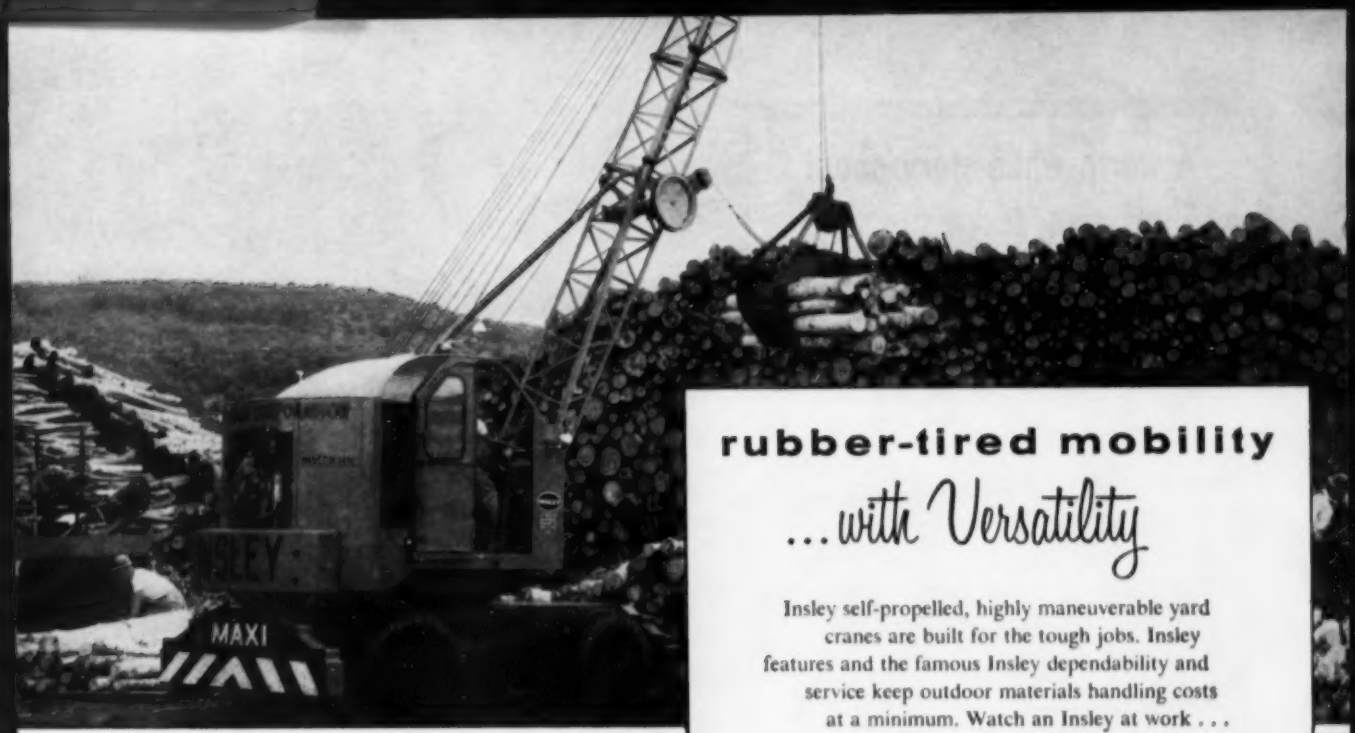

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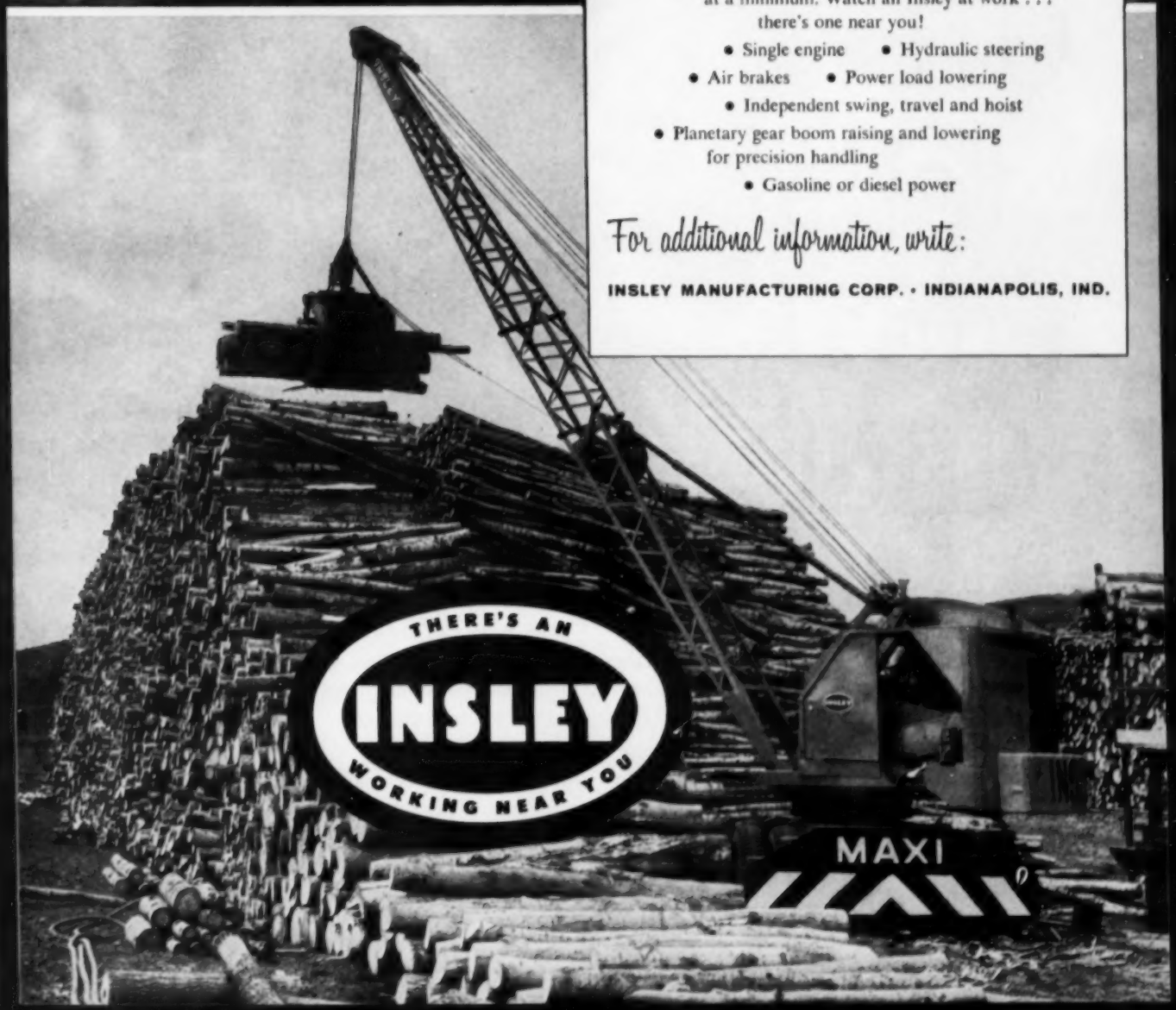

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World Trade

By
ROBERT C. HILL

AS THE CUSTOMARY dull summer season approaches, the charter market finds itself in the weakest position in the last three years. Since a month ago, rates have dropped appreciably, Trans-Pacific freights are down at least $2 a ton while in the world market a fair estimate of the decline is 10 to 15 per cent. As an illustration, full cargo scrap charters to Japan from the North Pacific, which reached a high of $230,000 early in the year are now quoted at $165,000.

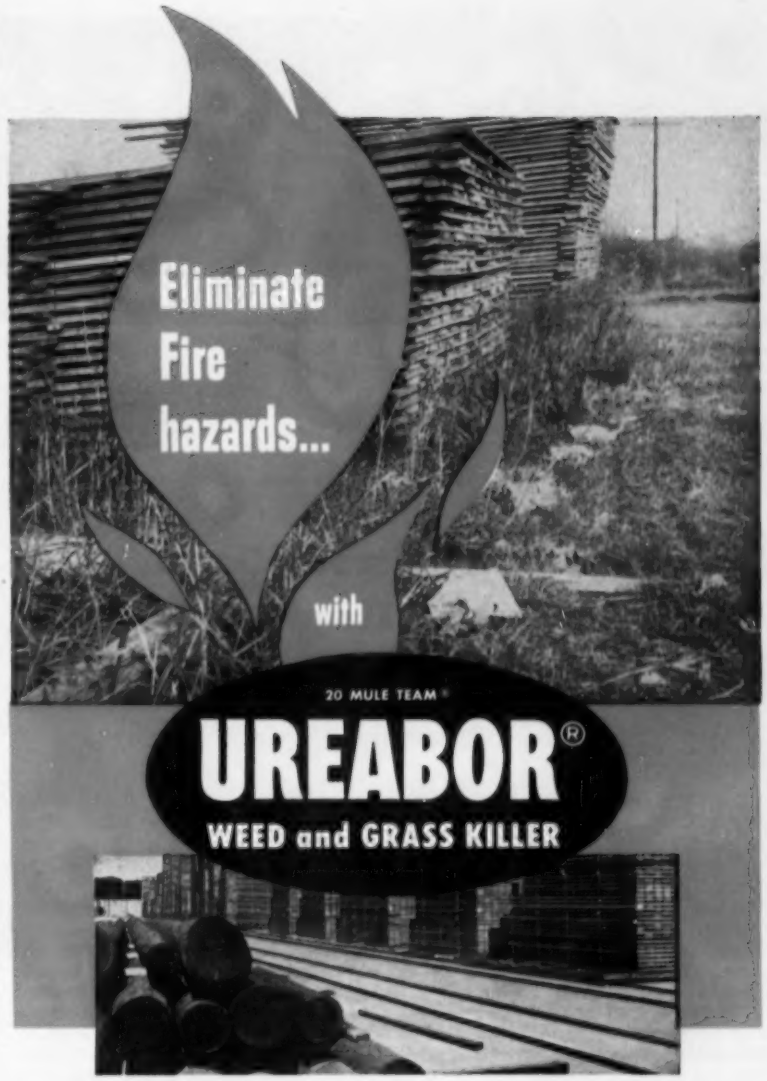
Several factors have contributed to the current weakness. Among them are: resumption of Suez canal traffic, resulting in shorter voyage distance and consequent less need of tonnage; less military cargo offering; decreased demand for trans-Atlantic coal carriers, more or less seasonal, but affected by the larger oil supplies now available in European ports; accumulation of tramp tonnage, returning from the Far East following an unprecedented cargo movement in that direction, and now seeking new business; tapering off of United States government relief and surplus cargoes which have had such a bullish market influence for months.

Full cargo lumber charters were more numerous than for several months, but all of them were closed for British Columbia loading. On the American side lumber exports are mostly parcel lots and little new business has been closed.

Lumber rates from British Columbia to United Kingdom, six charters reported during the month, ranged from $20.50 to $22 per thousand feet which is a considerable drop from the level of $27 for similar business reported six months ago. One full lumber cargo, British Columbia to South Africa, was done at $265,000, free load and discharge. This also compared with $330,000 reported early in the year.

Intercoastal operators report little demand for lumber space, the North Atlantic market continuing dull and weak. However, the coast to coast lines are not overtonnaged and find no difficulty in fulling their ships in both directions. Conditions are not favorable for British Columbia competition in this trade although a full cargo is reported, British Columbia to North of Cape Hatteras, May-June loading.

Changing conditions dictated the closing of the Seattle office of the Girdwood Shipping Co. which in the future will concentrate its operations out of San Francisco. For nearly thirty years President David R. Girdwood has been a leading figure in North Pacific shipping circles.



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AWARD WINNERS, front row, left to right: Irvin Boylen, Weyerhaeuser Tbr. Co., Springfield, Ore.; Zack Perry, Long-Bell Lbr. Co., Weed, Calif.; Leonard Mackey, Weyerhaeuser Tbr. Co., Springfield, Ore.; Lloyd Johnson, Southwest Lumber Mills, McNary, Ariz.; Dorothy Shane, C. D. Johnson Div., Georgia-Pacific Plywood Co., Toledo, Ore.; Ned R. Gee, Oregon Lbr. Co., Bates, Ore.; Mike N. Fell, Edw. Hines Lbr. Co., Hines, Ore.; Ralph Hartman, Crown-Zellerbach Corp., Seaside, Ore.; Louis Posey, Diamond Match Co., Cusick, Wash. Back row, left to right: Zay Epley, I. P. Miller Lbr. Co., Monroe, Ore.; A. J. Callaghan, American Forest Products Co., Lakeview, Ore.; Harold Brower, Oregon Lbr. Co., Dee, Ore.; Robert Elliott, Weyerhaeuser Tbr. Co., Klamath Falls, Ore.; E. M. Boddy, Crown-Zellerbach Corp., Portland, Ore.; Woody Johnson, Simpson Log. Co., Shelton, Wash.; Ed Roles, Weyer. Tbr. Co., Longview, Wash.; Phil Morrison, Simpson Log. Co., Shelton, Wash. Awards were presented at the annual banquet of the Safety Conf. in Yakima, Wash.

Safety Leaders Stress Good Performance as Key to Success

Forest Products Safety Conference in session at Yakima, Wash. discusses how to attain safety on the job.

ACTIVE PARTICIPATION OF EVERYONE involved in preventing accidents and obtaining a goal of better safety programs was emphasized by 219 delegates attending the 23rd annual Forest Products Safety Conference in Yakima, Wash., held April 4-6. Chairman Paul LeRoy, Weyerhaeuser Timber Co., Vail, Wash. presided over the sessions.

"Safety is a serious business and it is up to management to make working conditions less hazardous," said J. D. Bronson, Cascade Lumber Co., Yakima, Wash. He emphasized that no employer can side step the responsiblity of creating safe working conditions. Statistics show that mills of the 20-40 million board feet size are not as safe as big mills, and that the 10-20 million board foot mills are even less safe. Bronson urged officials of "middle-size and small' firms to take as keen an interest in safety practices as top management of the big companies.

Although it was conceded that safety conditions have improved, both in the woods and in the mills, Bronson said that hazards can be further reduced by careful study of causes of accidents and efforts to eliminate them. Speaking on the humanitarian side of safety, Bronson said, "In my opinion the employer who allows the same type of accidents to occur under the same type of conditions is just as guilty of safety violations as the worker who is criticized for carelessness."

Group discussions considered safety problems and answers, with E. M. "Chet" Boddy, Crown Zellerbach Corp., Portland, Ore. as coordinator. One group discussed safety in manufacturing. The second group discussed safety in logging.

How can we be certain that unsafe conditions are reported and that corrective action is taken?

All recommendations and suggestions must be acted upon. If suggestions are impractical, then the author should be advised as to the reason. Management should recognize the importance in equipment and procedures, and keep abreast of new developments.

What are the duties and responsibilities of supervision in relation to safety?

Support and stimulate interest in a Foreman's Safety Instruction course; supervisors must accept their responsibility for safety as well as for production; a foreman should sell any

NEW OFFICERS for 1957-58. Front row, left to right: exec. committee members, H. Chandler Drew, Medford Corp., Medford, Ore. and Fred Wade, Northern Interior Lumbermen's Assoc., Vancouver, B. C.; chairman, George W. Norris, B. C. Lumber Mfrs. Assoc., Vancouver, B. C.; vice-chairman, E. J. Reiten, Simpson Timber Co., Portland, Ore. Back row, from left: J. K. Lewis, Rayonier, Inc., Hoquiam, Wash.; exec. committee member, E. A. Roles, Weyerhaeuser Timber Company, Longview, Wash.; treas. Dennis Nichols, U. S. Plywood Corp., Seattle, Wash.; statistician, Francis W. Peck, J. Neils Lumber Company, Libby, Montana.

New Officers for 1957-58

CHAIRMAN: *George W. Norris, British Columbia Lumber Manufacturers Assoc., Vancouver, B. C.*

VICE-CHAIRMAN: *E. J. Reiten, Simpson Timber Co., Portland, Ore.*

SECRETARY: *J. K. Lewis, Rayonier, Inc., Hoquiam, Wash.*

TREASURER: *Dennis Nichols, U. S. Plywood Corp., Seattle, Wash.*

STATISTICIAN: *Francis W. Peck, J. Neils Lumber Co., Libby, Mont.*

EXECUTIVE COMMITTEE: *E. A. Roles, Weyerhaeuser Timber Co., Longview, Wash.; H. Chandler Drew, Medford Corporation, Medford, Ore.; Fred Wade, Northern Interior Lumberman's Assoc., Vancouver, B. C.; William B. Webster, Workmen's Compensation Board, Vancouver, B. C.; Frank White, Empire Box Co., Vancouver, B. C.*

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The speed with which operators sort and grade veneer is partially a matter of skill and agility. Skill is essential in many forms for good plant performance.

Of equal importance for profitable operation, however, is efficient, well coordinated machinery in the production line.

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Should you have any questions regarding the performance of COE machinery now installed, or be interested in improving your present operation by replacing older equipment, a COE field engineer is awaiting your call.

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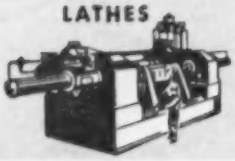
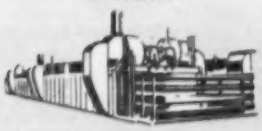
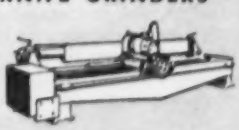


CLIPPERS

DRYERS



KNIFE GRINDERS



safety suggestion to his men.

What can be done to exchange more safety ideas and information within the industry?

There is a definite need for participation in local region or area safety meetings. There is a need for more training for foremen, for more publicity on the local level, and greater participation in the larger regional conferences.

What can be done to insure that new employes understand the importance of being safety conscious?

Try indoctrination, orientation, and follow-up. Too often it is left up to the new employe to find out for himself what the company policy is. More often he is given a briefing at the start of his employment and follow-up is neglected. He does not know if he is complying.

What can be done to improve housekeeping?

Proper indoctrination, proper equipment, proper supervision, better maintenance, and recognition. Good housekeeping is one of the principal reasons for a good safety record.

What can be done about on-the-job safety training?

Particularly important is the first discussion of safety with a new man. The new man should then be placed to work with a safe, experienced worker. The foreman should keep alert and set a good example. Safety films and other visual aids, first aid and special courses for all personnel were listed as essential parts of the training program.

Investigating every accident gets at the cause, helps prevent a recurrence, and stimulates everyone's interest in safety. Other attention getting ideas are slogans, posters, emphasizing guards, and prizes in the form of merchandise.

How can you promote safety consciousness in employes?

Use an education program which should include the committeemen and foremen and all employees down to the latest one hired. Only an all-inclusive program will work. Continual advertisement of the safety record also ranks high in combating carelessness.

What can be done to make safety meetings more interesting?

Election of safety committeemen by workers in the plant; a rotation of the safety committees; obtain outside speakers on safety; posters and cartoons and other visual aids.

How to deal with infractions of safety rules?

Rules should be compiled by labor, management, and the safety committee and should be conspicuously posted. Copies might also be handed out in pamphlet form with paychecks. When infractions occur, the supervisor should issue a written warning to the offender and obtain his signature on a copy, thus eliminating any excuse that he was not told. After two written warnings, suspension or separation is in order, depending on company policy.

THE ANNUAL HOOT OWL LUNCHEON, under the leadership of Bull Owl George Norris, Safety Director, B. C. Lumber Manufacturers Association, Vancouver, B. C., considered these problems:

What foot protection is there for extreme cold?

If electricity is available, there are heated pads to stand on which have proved very successful on green chains, etc. There are also boots available which have been successfully tested and proved comfortable in -37 degrees temperatures.

What can be done about lame backs?

No conclusions were reached, although everyone reported prevalance of this ailment.

Are industrial registered nurses practical in logging camps?

Dorothy Shane, Georgia-Pacific Plywood Co., Toledo, Oregon, only woman delegate, answered in the affirmative. She pointed out, however, that some companies use practical nurses in remote camps.

Special Features

The movie "Falling Timber", winner of a top award from the National Safety Council, was screened by the Rarig Motion Picture Co.

Exhibitors were permitted three minutes each to present their latest safety devices. These include back-up alarms to be attached to wheels of trucks and carriers; automatically inflated life belts or boom jackets; reflective paint, to be used on the ends of logs on long loads, etc.

ROBERT M. GILMORE, Rayonier, Inc., Hoquiam, Wash., spoke on "Z.16.1, the Measurement of Safety Performance". In defining Z.16.1, itself a definition, Gilmore traced the development of this measure of safety performance to the original statement in 1914. After being reviewed, the first standard appeared in 1936. Two changes have been made since then. The present standard came out in 1954. Typical of the questions dealt with are—did the injury arise out of work activity? What is a disabling injury? The term "disabling" injury is and should replace "lost-time" injury. Included in disabling injuries are death, permanent disabling, and those which keep a person from performing a regularly established job, etc.

Facts brought out in the discussion following Gilmore's presentation:

If a doctor says a worker is able but the worker elects not to work, the days should not be counted. The criterion is *disabling*—in the doctor's opinion. If a doctor says a man should not work, do not let him work. Protect yourself by insisting upon a release from the doctor.

Lending a man transportation does not put a man on company time. If

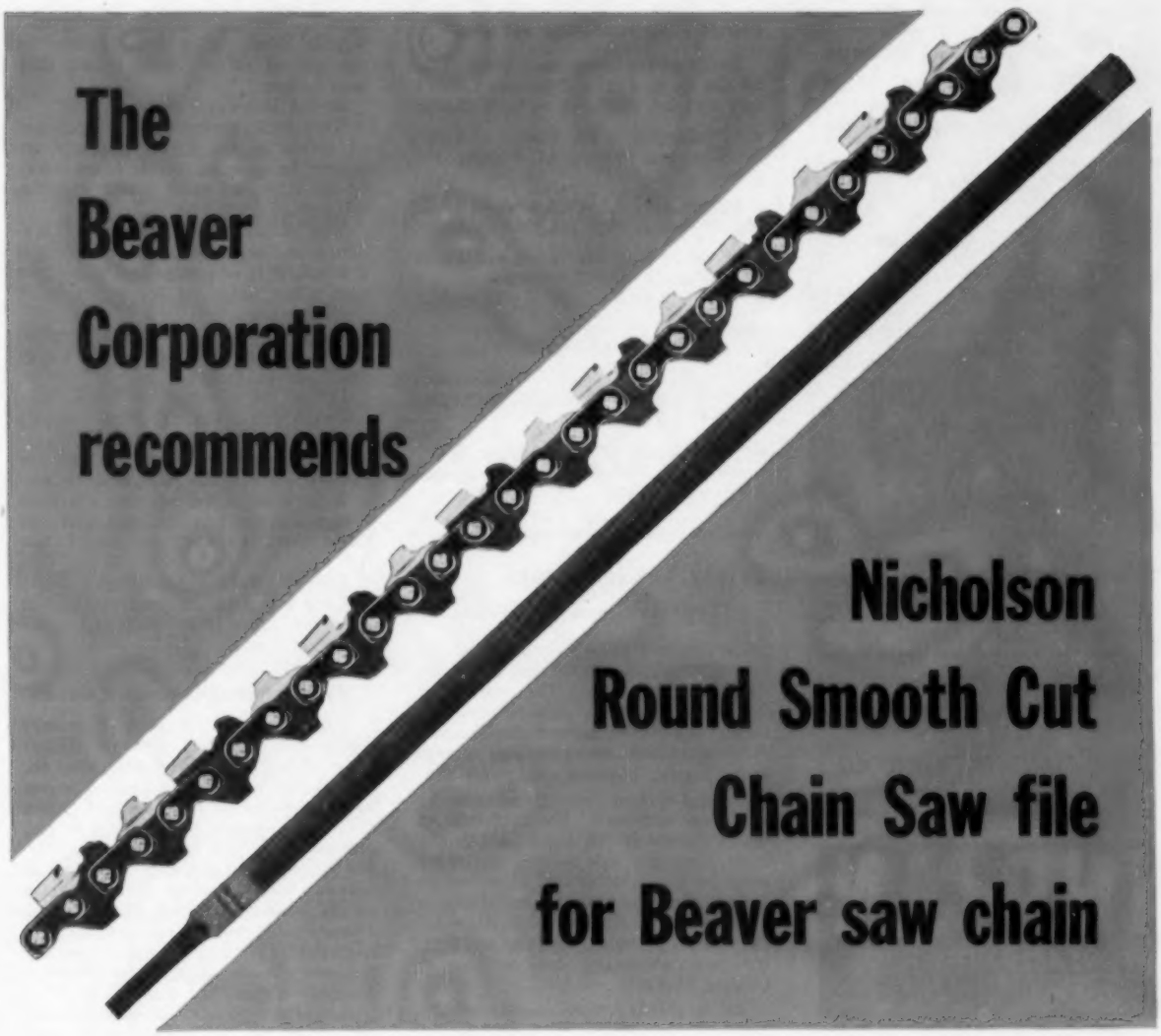
(*Continued on page* 106)

ROBERT CURRY of National Safety Council presents award plaque to Dorothy Shane of Georgia-Pacific Corp., Toledo, Oregon, winner in Group B—Plywood and Veneer Division.

NED B. GEE, at left, Oregon Lumber Co., Bates, Ore. receives coveted Improve-Award Plaque from L. T. Murray, Jr., exec. vice-pres., West Fork Timber Co., Tacoma, Wash.

OUTGOING CHAIRMAN, Paul LeRoy, Weyerhaeuser Timber Co., Vail, Wash. (left) hands gavel to 1957-58 chairman George W. Norris, B. C. Lumber Mfrs. Assoc., Vancouver, B. C.

The Beaver Corporation recommends



Nicholson Round Smooth Cut Chain Saw file for Beaver saw chain

Beaver's exclusive multiple-tooth construction assures smoother cutting and boring. This is so because the right and left side-cutters function independently, leaving the kerf to be removed by a specially designed raker. Tooth design gives extra strength—made of hard steel, Austempered and chromed to stay sharp *up to three times longer.*

Filing is the best and most economical way to keep your chain in tiptop cutting shape. Harsh methods of sharpening may crystallize the cutting teeth permanently. The manufacturer of this outstanding chain recommends that its users employ the Nicholson Round Smooth Cut Chain Saw file. This Nicholson file cuts with a smooth, crisp action . . . dresses teeth uniformly for long, economical chain life.

For longer chain life, always use Nicholson or Black Diamond files for *all* of your saw-filing needs

NICHOLSON FILE COMPANY, PROVIDENCE, R. I.
(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

NICHOLSON FILES *A FILE FOR EVERY PURPOSE*

STOP tramp metal damage with the RENS *electronic* metal detector

Size 30"x 23"x 9" Control Cabinet (Model CTB-45)

1. Instantly detects magnetic and non-magnetic metals.
2. Automatically stops belt and signals operator.
3. Can be installed by your own skilled personnel.
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PORTABLE FIRE PUMPS
Are "Choice for Quality the WORLD OVER"

All Seams are Electric Welded — no leakage. Pump throws 30 ft. pressure stream or nozzle adjusts for spray. Strongly built — lasts for years.

USES ONLY CLEAR WATER

No chemicals needed. For over 30 years INDIAN FIRE PUMPS have been first choice for fighting grass, forest, building, roof, rubbish fires, etc. Insulated tank prevents dampness touching the back.

Fire Chief S. W. Griswald says: *"I cannot praise INDIANS highly enough. There is nothing else will match them."* Another chief says: *"They are worth their weight in gold."*

The INDIAN is also made with lever type pump and handle.

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"Established 1868"
421 MAIN ST. UTICA 2, N. Y.

New Publications Issued

Seven publications have been issued by the U. S. Forest Products Laboratory and are available without charge.

- "Evaluation of the Factor of Safety in Structural Timbers," Report No. 2068.
- "Chemical Composition and Uses of Bark," Report No. 1666-5 (Revised).
- "Bark-Peeling Machines and Methods," Report No. 1730 (Revised).
- "Spanish Cedar," Report No. 1948 (Revised), one of the Laboratory's Foreign Woods Series.
- "Comparison of Wood Preservatives in Mississippi Post Study." (Report No. 1757 Revised).
- "Fabrication of Small Clear Specimens of Timber for Strength Tests," Report No. 2074.

Safety Leaders Meet

(*Continued from page* 104)

he is disabled before time on the job starts, it is not a disabling injury on the company's time. The man must be under company supervision and under the Workmans Compensation Act, according to American Standards. States, however, vary on this.

In aggravation cases there must be two clear cut cases. The fact that an injury occurs in the same part of the body does not rule it out, but there must be a sudden effort, blow, or incident. The fact that the initial injury weakened the affected part does not keep it from being another incident. However, something must be done to bring it about.

An accident clinic conducted by Tom North, Alaska Pine and Cellulose, Ltd., Vancouver, B. C. employed an audience participation true and false quiz.

In summarizing the conference, Jack C. Robins, Simpson Timber Co., Seattle, Wash., gave three reasons for the job of safety being bigger than ever before:

Rising industrial insurance cost.

Threat of governmental regulation of safety in the forest products industry, because performance on safety so far does not meet public expectation.

The market, with the present tendency to keep cost down. Safety will not sell if it is competing with costs and other items in the supervisor's attention.

Robins outlined a six-point program which would help solve the safety problems of today:

Define the safety objective.

Develop a program aimed directly at this objective.

Assign everyone some responsibility in carrying out the program.

Write it all down, because a written program is the best evidence that you know what you want and how to get it.

Budget safety expenditures.

Keep score on the program and let everyone know how you are doing now and then.

Wood Products Committee Meets

The Wood Products Executive Committee of the National Safety Council held a meeting preceding the Safety Conference. The section is one of 28 sections on the National Safety Council. Annually one meeting of this committee is held in the West to permit eastern and midwest members to become more familiar with this part of the country and its operators. Twenty-four committee members attended the session, presided over by General Chairman, Roy E. Johnson, Kroehler Mfg. Co., Kankakee, Ill.

In addition to conducting the necessary business, which included committee and other reports, plans were made for the next meeting which will be the National Safety Conference to be held in Chicago, October 21-24.

Safety Award Winners

Division	Company	Frequency Rate
Fir logging over 250,000 man-hrs.	Weyerhaeuser Timber Co., Longview, Wash.	13.99
Best 5-year cumulative frequency	Weyerhaeuser Timber Co., Springfield, Ore.	23.64
Fir logging under 250,000 man-hrs.	B.C. Forest Products, Renfrew Division	0.00
Fir logging under 250,000 man-hrs.	Crown Zellerbach Corp., Vernonia, Ore.	0.00
Fir logging under 250,000 man-hrs.	I. P. Miller Lumber Co., Monroe, Ore.	0.00
Fir logging under 250,000 man-hrs.	Oregon Lumber Co., Dee, Ore.	0.00
(Awards were made for the above 4-way tie on basis of longest number man-hrs.)		
Best 5-year cumulative frequency	Crown Zellerbach Corp., Vernonia, Ore.	15.36
Pine logging under 250,000 man-hrs.	American Forest Products Corp., Lakeview, Ore.	28.91
Best 5-year cumulative frequency	Southwest Lumber Mills, McNary, Ariz.	42.27
Pine logging over 250,000 man-hrs.	Edward Hines Lumber Co., Hines, Ore.	37.46
Best 5-year cumulative frequency	Edward Hines Lumber Co., Hines, Ore.	38.46
Sawmill operations over 750,000	Weyerhaeuser Timber Co., Klamath Falls, Ore.	2.53
Best 5-year cumulative frequency	Georgia-Pacific Corp., Toledo, Ore.	4.36
Sawmill operations 250,000-750,000	Oregon Lumber Co., Dee, Ore.	3.39
Best 5-year cumulative frequency	Weyerhaeuser Timber Co., Enumclaw, Wash.	11.99
Sawmill operations under 250,000	Oregon Lumber Co., Bates, Ore. (177,115 mh)	0.00
Sawmill operations under 250,000	Diamond Match Co., Pass Creek, Wash. (33,167 mh)	0.00
Best 5-year cumulative frequency	Simpson Logging Co.—McCleary Cutting	23.89
Plywood Operation	Weyerhaeuser Timber Co., Longview, Wash.	4.06
Best 5-year cumulative frequency	Weyerhaeuser Timber Co., Springfield, Ore.	6.40
Pulp & Paper	Crown Zellerbach Corp., Port Townsend, Wash.	0.00
Best 5-year cumulative frequency	Rayonier, Inc., Shelton, Wash.	4.16

New Divisions This Year

Shingle Mills	Canadian Western Lumber Co., Ltd., New Westminster, B.C.	7.51
Hardboard	Simpson Logging Co., Insulation board plant, Shelton, Wash.	8.27
Factory (Wood Products)	Simpson Logging Co., McCleary Door Div.	0.00
(Note: above record was Best in the Nation, and received National Safety Council Award)		
Improvement Award	Oregon Lumber Co., Bates, Ore.	6439.80%

Lebanite

The Hardboard that's NEW and DIFFERENT!

Lebanite's stable, weather-resistant surface adapts it to a multitude of uses. In garage door panels, it is easily worked for a variety of handsome effects.

- Smooth, Identical Finish on BOTH Sides
- Even BLOND Color for Smart Natural Finish
- UNIFORM Texture and Appearance, Board after Board
- No Delamination — HIGH INTERNAL STRENGTH
- Hard, Neat, Damage-Resistant Edges — Saws Cleanly, No Chipping or Flaking

IDEAL FOR Plastics Lamination, Core Stock for Hardwood Veneers, Furniture Backing and Facing, Television Cabinets, Displays, Exhibits, Store Fixtures, Toy Manufacture, Baby Furniture, House Construction, Kitchen Cabinets and many more modern uses!

LEBANEX HARDBOARD OVERLAY

Plywood core surfaced on both sides by Lebanite. Combines plywood's strength with Lebanite's smooth check-resistant, paintable surface.

PERFO-SQUARE HARDBOARD

The perforated hardboard with the square holes. Combines Lebanite's many advantages with square ¼" holes which design provides the largest bearing surface for product display.

To Find Out WHY *Lebanite Is Different — Everything a Hardboard Should Be — Send for Brochure and Free Sample Today*

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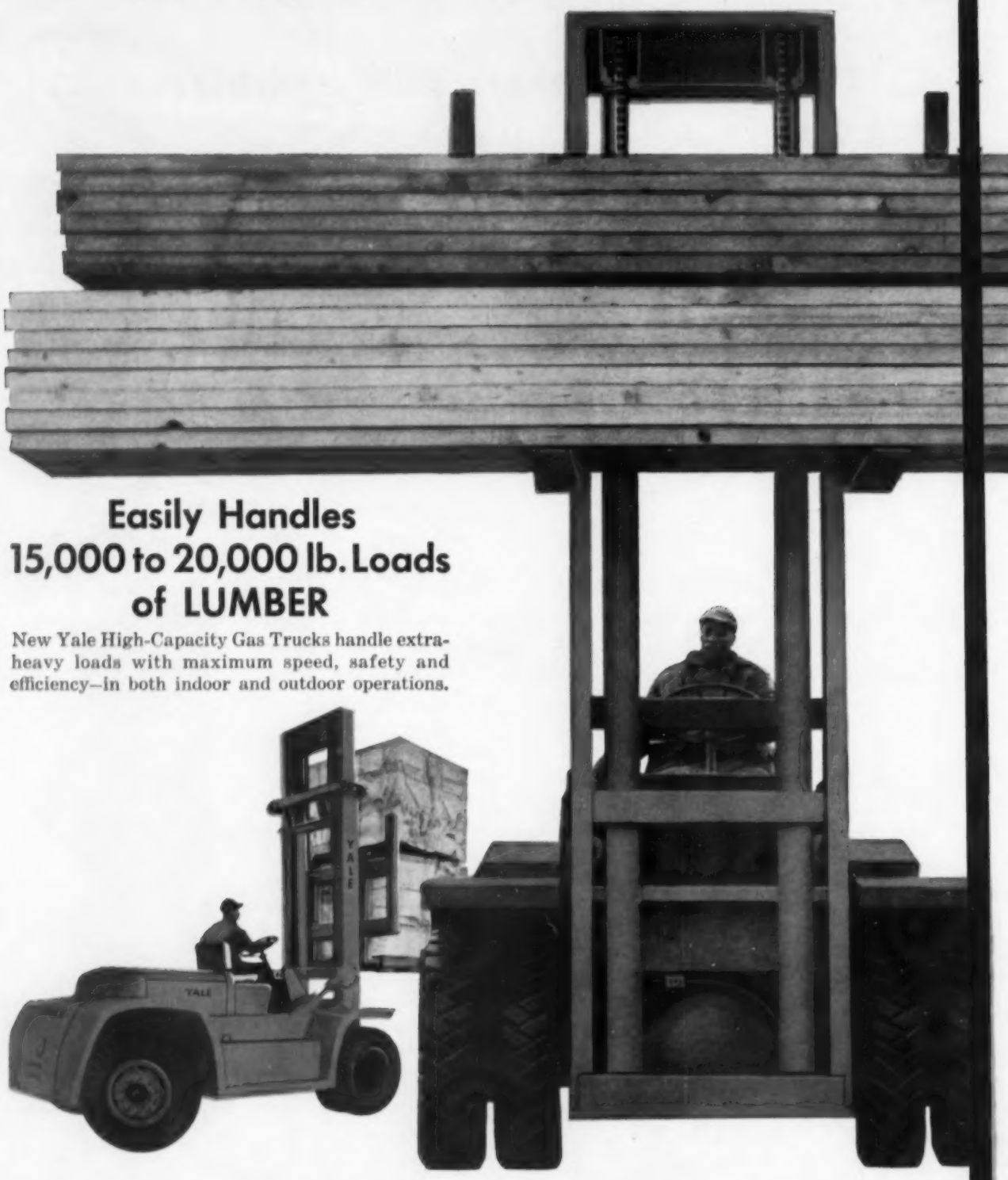

Easily Handles 15,000 to 20,000 lb. Loads of LUMBER

New Yale High-Capacity Gas Trucks handle extra-heavy loads with maximum speed, safety and efficiency—in both indoor and outdoor operations.

only high-capacity gas truck with full visibility

YALE
WIDE-ANGLE VISION

300% MORE VISIBILITY THAN ANY OTHER TRUCK OF ITS TYPE! Not just straight-ahead vision—but "corner of the eyes" vision, too—*fully functional* visibility with the big, open look of new Yale High-Capacity Gas Trucks. Operator sits high and in center. Upright channels are wide-spaced, nested to reduce frontal obstruction. Right next to them—the hoisting cylinders, one right, one left. Chains that raise carriage are in front of cylinders—*out* of the arc of vision.

Carriage has one top bar, one bottom bar—good visibility between them at all levels of fork lift. Channel cross members are at channel ends—none between. When an attachment is used, hydraulic hoses are located in front and behind cylinders—not in the line of sight. Whether looking forward or to the rear, the operator sees more. Result: these new Yale trucks with "Wide-Angle Vision" promote safer, faster, more efficient handling of 15,000 to 20,000 lb. loads.

GREATER STABILITY. Lifting, lowering, traveling—these Yale trucks keep capacity loads in precision balance! Minimum weaving with full loads, because the trucks are built low—low center of gravity, with high underclearance. Extremely rugged design. Broad lifting base afforded by two ball-mounted lift cylinders. Wide channel-roller spacing at all points of lift, plus side-thrust rollers on channels and carriage, further increase stability factor. Large-size, high-flotation tires give good traction under severest terrain conditions.

FAST CYCLE OPERATION. New Yale High-Capacity Gas Trucks have lifting speeds up to 60 feet per minute; fast, safe lowering; travel speeds up to 20 miles per hour; easy maneuverability.

TOP PERFORMANCE UNDER TOUGHEST CONDITIONS

Here are just a few of the premium engineering features—all included as *standard*—that give new Yale Gas Trucks a big edge in stamina and safety under all conditions:

- I-beam side members in frame for extra strength.
- Channels mounted on ball-bearing rollers to reduce friction and wear.
- Ball-mounted, self-aligning hoisting cylinders.
- Gear shift lever, plus hoist, tilt and attachment lever at right side of driver. Directional control lever conveniently located on steering column.
- Power steer with two balanced hydraulic cylinders, one to each rear wheel, to reduce stress on bearing points and linkage.
- Your choice of Yale Fluid Coupling or standard transmission.

Designed for complete selection of attachments—engineered for a minimum loss distance.

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INDUSTRIAL LIFT TRUCKS AND HOISTS

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Please send the new Yale High-Capacity Gas Truck brochure No. 5230.

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Gasoline, Electric & LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Hand and Electric Hoists

EQUIPMENT DISPLAY with 90 exhibitors, featured wide variety of log handling and manufacturing equipment used in South

Southern Pine Industry Reviews Automation, Utilization, Housing

Southern Pine Association, Southern Pine Inspection Bureau and Southern Pine Industry Committee hold annual sessions in New Orleans, La.

NEW OFFICERS of the Southern Pine Association, front row, from left: M. L. Fleishel, treasurer; Q. T. Hardtner, Jr., Urania, La., president; Leon Clancy, chairman of the board. Back row, from left: S. P. Deas, secretary-manager; W. R. Warner, Warren, Ark., second vice-president; M. W. Smith, Jr., Jackson, Alabama, who was elected first vice-president

New Officers Southern Pine Association

CHAIRMAN OF THE BOARD, Leon Clancy, Clancy Lumber Co., Decatur, Alabama.

PRESIDENT, Q. T. Hardtner, Jr., The Urania Lumber Co., Urania, La.

FIRST VICE-PRESIDENT, M. W. Smith, Jr., M. W. Smith Lumber Co., Jackson, Ala.

SECOND VICE-PRESIDENT, W. R. Warner, Southern Lumber Co., Warren, Ark.

TREASURER, M. L. Fleishel, Fleishell Lumber Co., Jacksonville, Fla.

SECRETARY, Stanley P. Deas, New Orleans, La.

DIRECTORS AT LARGE: M. L. Fleishel, Fleishel Lumber Co., Jacksonville, Fla.; Edward A. Hauss, Century, Fla.; E. L. Kurth, Sr., Angelina County Lumber Co., Keltys, Texas; W. B. McNeal, Argent Lumber Co., Hardeeville, S. C.; B. A. Mayhew, Fordyce Lumber Co., Fordyce, Ark.; S. E. Moreton, Sr., Central Lumber Co., Brookhaven, Miss.; H. M. Seaman, Kirby Lumber Corp., Houston, Texas; Eli Piener, P. O. Box 35125, Dallas, Texas.

AUTOMATIC LOG LOADING, riderless sawmill carriages, power saws and finger jointing equipment were other features of display

Southern Pine Association Considers Lumber Future

AN INCREASING TIMBER SUPPLY, more mechanization in sawmilling and more stress on quality production were highlighted by speakers as significant developments, at the 42nd annual session of the Southern Pine Association. The meeting, held in New Orleans, La., on April 8 and 9, was presided over by president Leon Clancy, Clancy Lumber Co., Decatur, Alabama. A machinery show was held in connection with the sessions.

However, a note of cautious optimism was sounded on possible developments in housing that might bolster lumber markets.

Mr. Clancy emphasized research needs:

- Other materials, like aluminum, are pouring millions of dollars into their planning to take away lumber markets.

- The task is to energize efforts in research.

- Other incentives for broadening the base of SPA's program include the report on the nation's timber resources issued by the U. S. Forest Service. The T. R. R. says that the South is growing more than its cutting or about 2½ billion board feet.

- Sawtimber has improved considerably, in quality as well as quantity.

ON TRADE PROMOTION EFFORT, Mr. Clancy said:

- Promotion of high lumber standards constitutes the Association's No. 1 merchandising tool. This involves a variety of consumer education programs on the importance of properly manufactured, seasoned and graded lumber in home building, with consumer protection as the ultimate objective.

- A recent analysis from 139 identical mills, whose annual production exceeds more than a billion board feet, showed that in 1956, these mills shipped 5.5 percent more lumber than they did in 1954. For the same period, their orders increased by 4.2 percent. These increases are in direct contrast to what happened on the housing front. According to the U. S. Departments of Commerce and Labor, new housing starts in 1956 were 9 percent less than in 1954.

- Southern pine mills actually produced more lumber last year than in 1955, the year of the boom, and 11.2 percent more than in 1954. They shipped 96 percent of their 1956 production.

Commenting on mechanization, Mr. Clancy added:

"A clearing house has been established for an interchange of ideas. Subscribers are brought face to face with qualified experts who are developing the tools today for the lumber industry of tomorrow. As a result, a distinct trend toward mechanization becomes more pronounced each year."

WALTER M. LEUTHOLD, president of the National Lumber Manufacturers Association, told the convention "there is great national concern over the failure to increase GI housing interest rates. My own belief is that failure to increase GI interest rates will result in reduction of the number of housing starts this year by at least 100,000, which in turn means a market loss of a billion board feet of lumber.

"Demand for money is greater than the supply. Last year and this year,

SHOWN IN PHOTO, from left, are Norman Mason, FHA Commissioner; Leon Clancy, Clancy Lumber Co., Grayson, Ala.; Walter Leuthold, NLMA pres.

SHOWN ABOVE, Kenneth Smith, The Pacific Lbr. Co., San Francisco, Calif. (left) and W. S. Fox, N. S. Fox & Sons, Pine Bluff, Ark.

SPA TRADE Promotion Committee members. From left: H. L. McNeill, Kirby Lumber Corp., Houston, Texas; T. H. O'Melia, Fulton, Ala.

SHOWN AT MEETING, Russell Bell, The Crossett Co., Crossett, Ark., left, and Milton H. Mater, Mater Machine Works, Corvallis, Ore.

too, we will be short about one billion dollars in available capital."

Mr. Leuthold described the great potential lumber markets in school building. "I envision a $4 billion market in this field by 1966—it is already worth $2½ billion.

He quoted statistics which showed that growth of sawtimber in the South exceeds cut by 21 percent. In 1956, he said, the South provided 33 percent of the total lumber produced in the nation, an increase over 1955.

Norman P. Mason, Commissioner, Federal Housing Administration, said he "would like to be able to go even farther than we can go under present authority in liberalizing down payment requirements.

"The Administration has recommended some changes to help in solving current industry problems which have limited the production of housing in the last few months."

COMMISSIONER MASON REVIEWED recent FHA action in reducing minimum down payment requirements for FHA insured home mortgage transactions by two percent.

"We need to build at least a million new houses every year to take care of the new households that are being formed at the rate of 810,000 a year and to replace homes demolished or no longer usable."

Mr. Mason cited some specific FHA programs, he said would create markets for lumber:

- Housing for the elderly. FHA can now insure mortgages at liberal terms to finance housing built by non-profit organizations and specially designed for occupancy by persons who have reached or passed 60.
- Housing for the armed services, with 16,000 units under construction and over 92,000 units approved for development.
- Urban renewal projects in hundreds of cities.
- The home modernization business.

Mason expressed concern at a rise in cost of the average FHA home—11 percent higher in 1956 than in 1955.

He also made reference to the question of thickness of one-inch boards.

"THIS IS STILL UNSETTLED. From our point of view, a board has to be thick enough to give rigidity to a structure and thick enough to hold the nails or other fasteners with which roofing, flooring, siding, etc. are applied to it."

On the question of lumber standards, he declared:

"It's time the lumber industry realized that the public in general can't be ignored and does have a right to know what sort of materials are going into the structures people buy."

One panel session discussed SPA Trade Promotion, with T. H. O'Melia, Fulton, Alabama, vice-president in charge of trade promotion, presiding.

Lumber manufacturers of the Southern Pine Association were urged to continue their fight for high lumber standards. The panel, with home builders, retail lumber dealers and Southern Pine manufacturers participating, also stressed the importance of closer cooperation and communication between these three segments of the building industry.

Members of the panel were T. L. L. Temple, III, Southern Pine Lumber Co., Diboll, Texas, representing manufacturers; James H. Smith, home builder, Baton Rouge, Louisiana; and Harry V. Balcom, Bolinger Lumber & Supply Company, Bossier City, Louisiana.

TEMPLE POINTED to the dealer as the industry's logical choice to interpret these standards to the builder and general public.

In addition to advertising and promotion, Mr. Balcom said that manufacturers, individually and through their association, should "get into dealer programs more often." Lumber dealers, he said, are constantly in need of information relating to such things as new product development and availability of various products.

Mr. Smith agreed with the panel on the importance of the lumber dealer and the need for maintaining high standards.

"Consumers must know what lumber standards mean to them," Mr. Temple said and added that the future success of the lumber industry would depend on its ability to define, police and interpret these standards to the public.

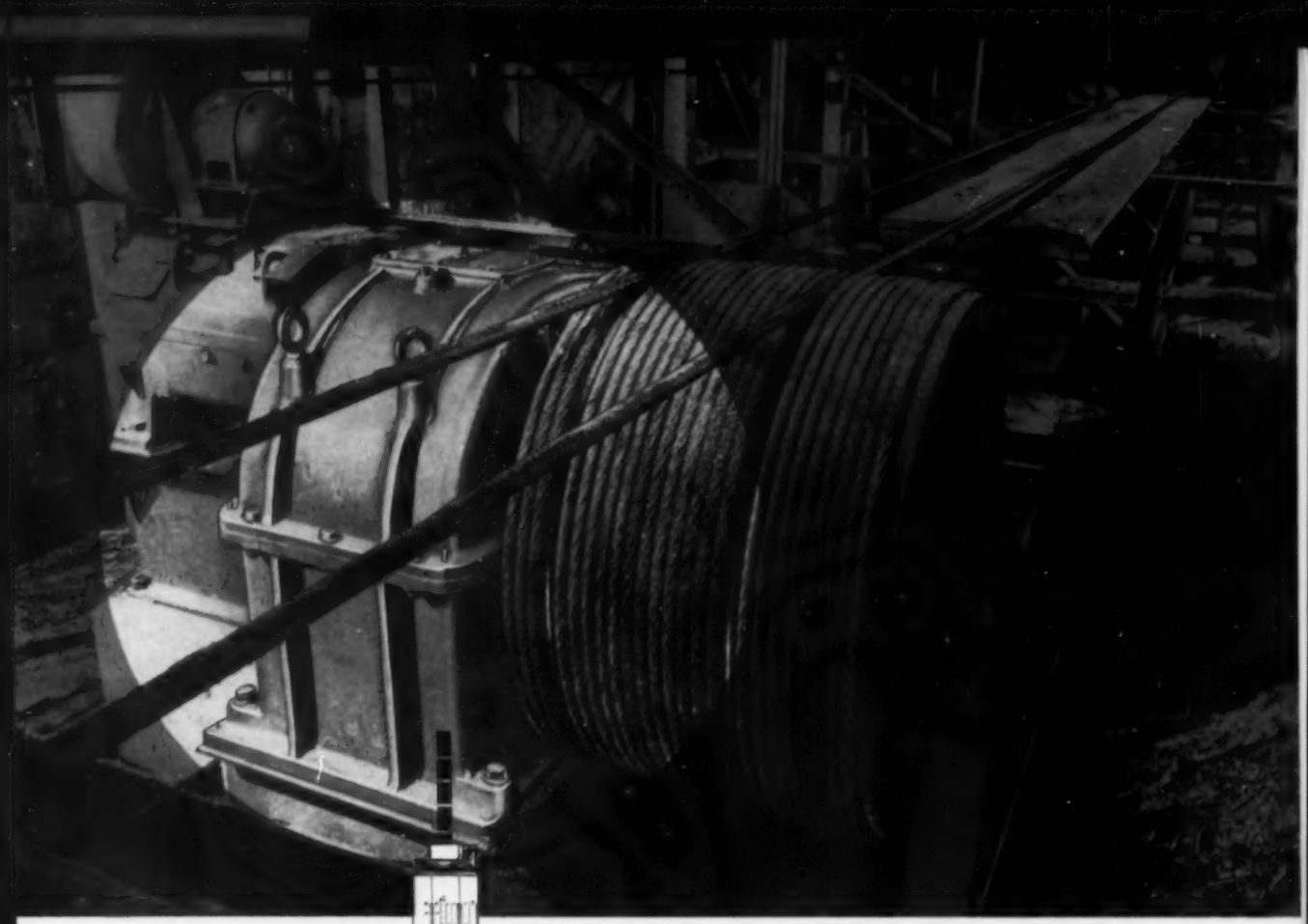
Primary emphasis on the mechanization panel was on greater utilization of the timber harvest, more efficient manufacturing processes and improved material handling equipment. This meeting was sponsored by SPA's Mechanical Efficiency Committee, with W. R. Warner, Southern Lumber Co., Warren, Ark., presiding.

MILTON H. MATER, president, Mater Machine Works, Corvallis, Ore. told the group that "in automation mill operators have a new ally in lowering their 'break even' point so they can make a decent profit even when lumber prices sag."

Mr. Mater defined "Automation Potential."

"For instance, if a mill has four

(*Continued on page* 126)

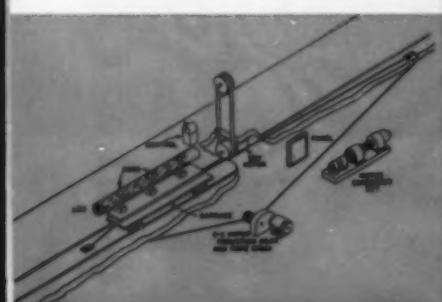


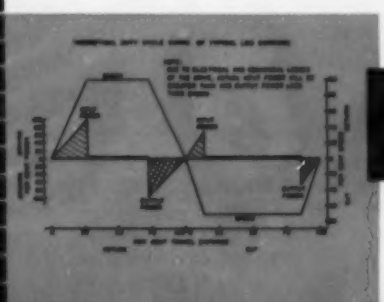
WESTERN GEAR speed reducers insure RELIABLE log carriage drive operation

Using a Western Gear speed reducer (foreground), the General Electric log carriage drive has proved a profitable investment for progressive lumber producers. Substantial savings in fuel and maintenance costs plus an extra margin of safety in operation have been some of the benefits of recent installations.

When the electric log carriage was first developed, Western Gear engineers were called in to design and manufacture a speed reducer for the unit which would be more reliable than any yet produced. Our engineers were well aware that a failure of the carriage drive could not be tolerated for it would mean a costly mill shutdown. That our engineers did their job well is proven by the fact that there are now many such drives operating in the mills. Many mills are now converting from steam to electric log carriage drives.

There are *many thousands* of Western Gear speed reducers in mill service throughout the nation. Their owners are enjoying the satisfaction that comes from wise investment in quality Western Gear products. If your problem involves gearing, enclosed drives or special machinery, you can rely on Western Gear for a completely satisfactory installation. For assistance without obligation, write Western Gear Corporation, General Offices, P.O. Box 182, Lynwood, Calif.



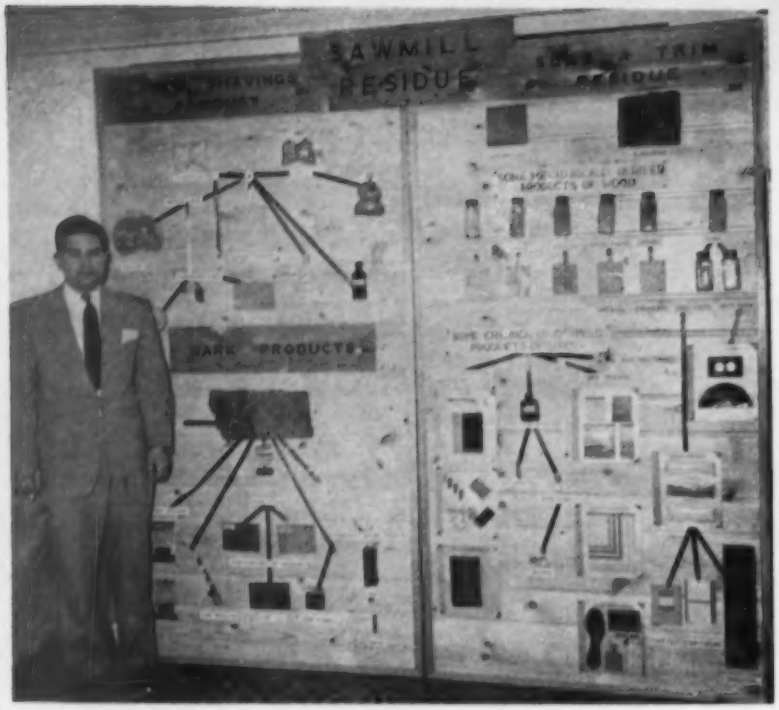


"The difference is reliability" • Since 1888

WESTERN GEAR Corporation

ENGINEERS AND MANUFACTURERS

PLANTS AT LYNWOOD, PASADENA, BELMONT, SAN FRANCISCO (CALIF.)
SEATTLE AND HOUSTON – REPRESENTATIVES IN PRINCIPAL CITIES



JOHN P. KRIER, Montana State Univ., secretary-treas. and panel member of clinic, stands beside display of sawmill residue utilization prepared by wood utilization classes.

Mergers Encourage Use of Raw Materials in Forest Industry

Wood Products Clinic reports on riderless carriages, memory devices and production analysis.

PRODUCTION ANALYSIS, QUALITY CONTROL, and marketing problems received consideration at the 12th annual Northwest Wood Products Clinic held in Spokane, Wash. on April 9th and 10th. The meetings were presided over by Howard W. Russell, Russell & Pugh Lumber Co., Springston, Idaho.

Function of mergers, which appear to be a trend in modern business, were outlined by H. H. Koessler, Intermountain Lumber Co., Missoula, Mont. He said the number of sawmills in the United States has been reduced in the past few years from about 50,000 to 45,000. Merger permits mills to perform more efficiently, possibly because larger amounts of capital and raw materials become available. Most of the 45,000 mills in the country do not have the capital to practice complete utilization; many still use only a little over 40% of a log.

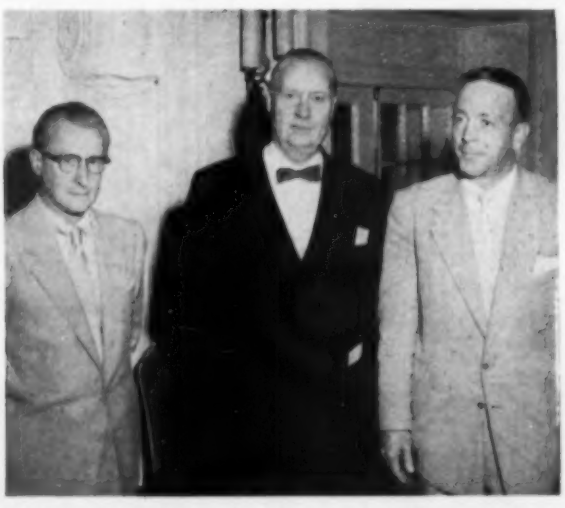
Arson as a production tool was described by Douglas Iler, Phoenix Insurance Co. of Hartford, Spokane, Wash. Iler, defining insurance, outlined what should be done in programming insurance:

- Determine what type of loss would be fatal to the business.
- Determine the next most serious loss, etc. down to frills or losses which range from $100 to $500.
- Make provision for bodily injury liability, frequently a fatal loss if it had to be paid.
- Determine value of buildings and equipment, preferably by a reputable appraiser.

Iler pointed out ways to reduce premium rates:

- Provide water barrels and pails at strategic points which can reduce the premium 2%.
- Practice good housekeeping.
- Provide a properly installed sprink-

NEWLY ELECTED president, M. E. Jones, left, Northwest Timber Co., Gibbs, Idaho, receives gavel from outgoing pres. Howard W. Russell (right), Russell & Pugh Lumber Co., Springston, Idaho.



THREE PANEL moderators, L. to R., A. W. Crawford, Ohio Match Co., Coeur d'Alene, Idaho; L. R. Pugh, St. Maries Lbr. Co., St. Maries, Idaho; Norman L. Mikalson, Columbia Lbr. Co., Spokane, Wash.

To form the new flake board "Cedawood"® in its Everett, Washington plant, the Columbia Hardbord Co. uses a 10-opening Washington press, loader and unloader for completely automatic operation.

The following hardboard and particle board plants are using, or have on order, Washington presses and accessory equipment:

ABITIBI POWER & PAPER CO. LTD.
Sturgeon Falls, Ontario, Canada

AMERICAN PARBOARD CORP.
Black Mountain, North Carolina

CAROLINA FOREST PRODUCTS INC.
Wilmington, North Carolina

COLUMBIA HARDBORD CO.
Everett, Washington

GEORGIA-PACIFIC CORP.
Coos Bay, Oregon

GRAY PRODUCTS COMPANY
Waverly, Virginia

JOHNS-MANVILLE PRODUCTS CORP.
Natchez, Mississippi

MASONITE CORP. OF AUSTRALIA LTD.
Eildon, Australia

POINSETT LUMBER & MFG. CO.
Pickens, South Carolina

POPE & TALBOT INC.
Oakridge, Oregon

TIMBER ENGINEERING CO., INC.
Washington, D. C.

Washington automatic hot press equipment has industry-wide acceptance

Many plants like Columbia Hardbord Co. are profiting from the engineering and manufacturing experience of Washington Iron Works in building an automatic machinery package for particle board production. All units in a Washington press installation are designed and built to meet specific production requirements of board size, forming speeds and minimum cycles, in addition to being integrated with the plant layout of each customer. *Write for details.*

HOT PLATE PRESSES • AUTOMATIC PRESS LOADERS AND UNLOADERS • COMPLETE DRY PROCESS HARDBOARD FORMING EQUIPMENT AND SPECIAL MACHINERY

WASHINGTON IRON WORKS

WASHINGTON IRON WORKS, 1500 Sixth Ave. South, Seattle 4, Washington

I accept your invitation to reserve a copy of the full color 12-page brochure on Washington presses and equipment to be published soon.

Name _____

Address _____

City _____ Zone _____ State _____

NEWLY ELECTED officers and directors for 1957-58, from left to right: William H. Knight; John P. Howe; Robert E. Jones; John P. Krier, sec.-treas.; M. E. Jones, pres.; Howard W. Russell; Steele Barnett; Norman L. Mikalson; Donald M. Sowa and R. David Brown.

ler system which can pay for itself in reduced premiums in three to six years.

Desirable types of insurance include.

- Business interruption insurance, which provides for loss of income due to business interruption.
- Non-owned auto insurance, where an employe makes an errand for the company but uses his own car.

"IS THE DEMAND FOR NEW HOUSES as insatiable as we have been led to believe?" asked Edwin J. McWilliams, Fidelity Savings and Loan Assoc., Spokane, Wash. In 1944 there were 138,700 houses built. California alone has been building that many every year since 1950. Over 10 million houses have been built since World War II. "The critical housing boom of the '40s is over," McWilliams said, "and the boom of the 1960's is not yet here."

McWilliams listed factors bringing about the tight money situation of today:

- Cost of wholesale money has risen rapidly.
- A minor regression occurred in 1953.
- Mortgaged indebtedness has raised immensely.
- Consumer credit increased over $6 billion in the period 1954-55 alone. From 1952 to 1956 spending was greater than income.

Loan companies have loaned about as much as they can. With present market conditions, the period from production to final sales has been expanded today, and someone has to carry the inventory.

"The future of the forest industry will abound with opportunities for those who are aware," delegates were told by Walter DeLong, Weyerhaeuser Timber Co., Tacoma, Wash., speaker at the Chamber of Commerce luncheon. "The transition from virgin tree crops to completely managed timber crops will not be easy," DeLong said, " but it is the only long range plan."

RIDERLESS VS. SETTER OPERATED carriages were compared by Earl Walters, Western Pine Assn., Portland, Ore. He cited several time studies made on 16-foot logs in both single cut and double cut mills. Results as to time showed following effects on sawing operation:

- Time varied little in different plants when the band mills were comparable.
- Certain riderless carriages were faster. Most mills report seven to eight days break-in period necessary on change over from setter operated carriages to riderless carriages.

Effects on the non-sawing operations were:

- Time of operation varied some in the different mills.
- Sawyers on riderless carriages with six to eight months experience were as fast or faster on logs up to 24 inches in diameter. They were not faster on larger logs.

Important factors throughout the studies were—size of logs, single or double cut headrig, and experience of sawyer.

For factors of sawing accuracy three riderless and three setter operated mills were studied. Only *one* mill was sawing in perfect control in cut in one direction. It was determined that:

- Riderless carriages are as accurate as setter carriages in comparable mills.
- Production is comparable.
- Substantial increases are possible where riderless replaces slower setter carriages.
- Definite savings can be affected by eliminating one man.

Development of high speed steels up to the modern M2 was reviewed by Kenneth Duff, Henry Disston Co., Seattle Wash. He explained differences in tool steels and included among those used today tungsten carbide, tantalum carbide, and titanium carbide. Carbide sawing and planing tools can not be sharpened as sharp as steel, Duff said, but the edge lasts longer. They are jointed best by a diamond hone or diamond wheel. "We are going to see great changes in the near future in wood cutting tools," Duff predicted.

DELAYED MEMORY PROGRAMMING is a means of controlling certain functions in process of manufacture by programming in advance said Harold F. Green, Irvington Machine Works, Portland, Ore. The system must set up a zone of memory related to the area of control, and also be able to cancel out. Green said there is no limit to the operations which can be controlled by this first step toward automation, but some of the devices to be controlled are not perfected.

Production analysis, said William N. Pauley, H. E. Bosay, Jr., consulting engineers, Spokane, Wash., is one of the best available means to discover weak points, diagnose ills, and determine where a plant can be improved, and for planning future production. Production analysis is aided by the flow sheet, an effective means of presenting the clear picture needed for planning, control, cost accounting, changes and reduction in cost of production.

A properly prepared flow sheet is equally useful to:

- The novice who must grasp the overall picture before he becomes a useful member of the organization.
- The foreman who must know how his men must expend their efforts to best advantage.
- The cost accountant who must keep management informed of production cost trends.
- The engineer who plans changes to equipment or improvements in plant efficiency.

(*Continued on page* 118)

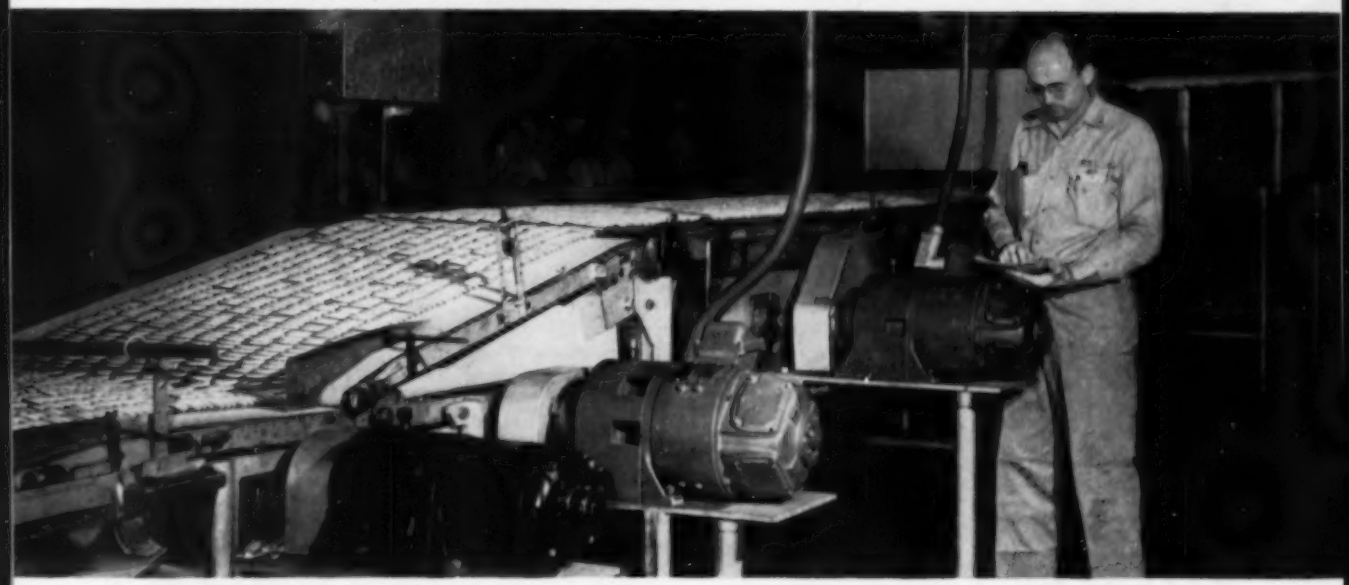
New Officers

PRESIDENT: M. E. Jones, Northwest Timber Co., Gibbs, Idaho.

SECRETARY-TREASURER: John P. Krier, Montana State University, Missoula, Mont.

DIRECTORS: John P. Howe, University of Idaho, Moscow, Idaho; Robert E. Jones, Lumber By-Products Co., Spokane, Wash.; H. W. Russell, Russell & Pugh Lumber Co., Springston, Idaho; Steele Barnett, Boise-Payette Lumber Co., Boise, Idaho; Norman L. Mikalson, Columbia Lumber Co., Spokane, Wash.; Donald M. Sowa, Twin Feathers Mills, Inc., Kamiah, Idaho; R. David Brown, Long Lake Lumber Co., Spokane, Wash.; William H. Knight, Division of Industrial Services, State College of Washington, Pullman, Wash.

FROM AUTOMATED MACHINES . . .



TO COOKIE CONVEYORS . . .

General Electric Gear-Motors Prove Low-Cost Dependability in Every Industry

Whether you use cranes or conveyors, machine tools or mixers, *any* of the host of applications employing low-speed drives, G-E gear-motors can save you money.

The more compact construction of the packaged gear-motor design assures speed reduction in a minimum of cubic feet. Units are easy to install, and, because gear-motors are built for specific speed requirements, may be direct-connected, if desired. This means down time can be reduced because inspection and replacement, common with belts, chains and other forms of speed reduction, are not required.

To meet the increasing demand for gear-motors, General Electric has consolidated its gear-motor activities and established a new Gear Motor and Transmission Components Department in Paterson, N.J., devoted solely to the design and manufacture of mechanical power transmissions. For more information, contact your G-E Apparatus Sales Office or nearest gear-motor distributor. *Gear Motor and Transmission Components Department, Paterson, New Jersey.*

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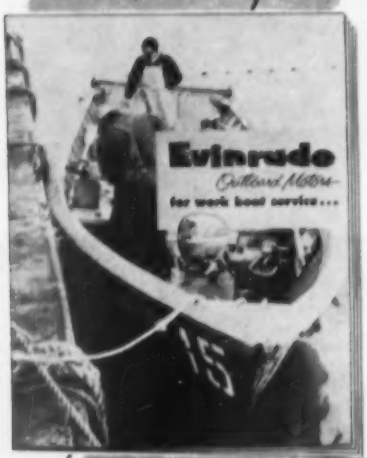
Progress Is Our Most Important Product

GENERAL ELECTRIC

new book



gives you the facts on

modern

OUTBOARD POWER

for *lumbering* service

TODAY there's a *new kind* of outboard power for work boat duty! A complete line of new Evinrude *Aquasonic* models so advanced in capability, stamina, and smooth, quiet operation that they set entirely new standards of performance. Get the facts! Send coupon for booklet.

EVINRUDE MOTORS
Division of Outboard, Marine & Mfg. Co.
4631 N. 27th Street, Milwaukee 16, Wisconsin

Send me booklet on outboard power for work boat duty.

Name.....

Address.....

City.....Zone...State.....

(In Canada: Mfd. by Evinrude Motors of Canada, Peterborough)

Wood Products Clinic

(Continued from page 116)

• Management who must always be interested in increasing profit margins and meeting competition.

Diagrams displayed by S. E. Corder, Oregon Forest Products Laboratory, Corvallis, Ore., showed the breakdown in western Oregon first, for a sawlog in an average mill, and second, a plywood log.

Sawlog figures were: lumber, 46%; coarse residue, 17%; sawdust, 13%; shavings, 8%; bark, 16%.

Plywood log figures were: plywood, 46%; veneer clippings, 14%; roundup, log trim, spur trim, 8%; cores, 5%; dry-end residue, 14%; bark, 13%. Corder said, "In the past three years the use of wood residue for pulp and fibre has doubled."

MANUFACTURE OF PHENOLIC glues and their application and uses were outlined by Bayard L. Carlson, American Marietta Co., Seattle, Wash. Knothole plugging was demonstrated by slides and by a practical demonstration using an electric clothes iron for heat and aluminum foil for a caul plate. The result was ready for the sander and showed good nailing quality. Advantages of this system of upgrading plywood and lumber are that manufacturing costs are cut and the reclaimation of rejected items may be economically accomplished.

In a roundup of new products, processes and methods, John P. Krier, Montana State University, Missoula, Mont., presented novelties and samples ranging from ingenious marriages of wood and plywood to a laminated wood spring. These included:

• Machine-grooved plywood on thick softboard (to keep it from looking like wallpaper).

• Thin veneer on hardboard.

• Resin impregnated paper overlay.

• Hardboard-faced softboard.

• Hardboard-faced plywood.

• Honeycombed core with plywood face (for moveable panels for non-supporting walls).

• Aluminum on wood.

• Aluminum on plywood.

• Wood on cloth (wall covering).

• Composition shingles on wood (will not pick up in wind, but will hold color).

Dr. George G. Marra, Washington State College Division of Industrial Research, Pullman, Wash. told of his United Nations trip to Europe and the Geneva Conference, which discussed particle board, hardboard, and insulation board. Marra said Germany is the world leader in particle board manufacture. Mass interest throughout the world in particle board stems from the fact that the same amount of wood put into particle board goes a lot farther than in any other way.

MURCO Wastewood Chippers

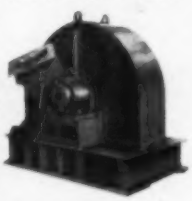
From slabs, edgings, planer mill trimmings, round wood, veneer cores, mill waste, etc., you can produce specification-size pulpwood chips with MURCO Wastewood Chippers, as many mills throughout the country are now doing. They have stopped burning dollars and are now selling chips. MURCO Wastewood Chippers are preferred for their outstanding performance, producing more and better chips at less cost with less sawdust and slivers, free from repairs.

MURCO SMALL LOG CHIPPERS

Designed for use on round logs where production demand is relatively small . . . made in disc diameters 36", 42", 48", 54", and 60" . . . illustrated with V-Spout and blower housing.

MURCO MULTI-KNIFE CHIPPERS

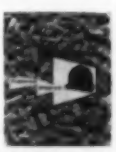
MURCO 12-Knife high speed Wastewood Chipper is designed along the general lines of the standard MURCO Pulpwood Chipper, ruggedly built and is used where high production is required to produce a high quality chip . . . made in disc diameters 56", 64", and 72".



MURCO MECHANICAL FEED WASTEWOOD CHIPPERS

Made in 75" disc diameter, MURCO Mechanical Feed 4-knife Wastewood Chipper has angle feed for over-head processing of slabs and edgings for chipping process at floor level . . . also available in horizontal type mechanical feed where head room is at a premium.

Write for new chipper catalog, fully illustrated, that describes complete MURCO Chippers.



D. J. MURRAY MANUFACTURING CO.

Manufacturers Since 1883

WAUSAU MURCO WISCONSIN

Drivers get set to "hit the road" with the first of the 1000 new Power Giants ordered by Ryder System, Inc.

Dodge awarded 1000-truck order

"We picked these Dodge Power Giants to give our truck-lease customers the finest hauling and delivery operation at lowest cost", James Ryder (right), president of Ryder System, Inc., tells Lee F. Desmond, vice president of Dodge.

Ryder System, Inc., world's largest exclusive truck-leasing company, puts low-cost operation first... picks Dodge for record order

When your business is leasing trucks, there's only one way to make it pay off. And that's by keeping your operating costs per mile at rock-bottom levels. That's why Jim Ryder, president of Ryder System, Inc., decided on Dodge when he needed new trucks. He knew that Dodge trucks are built to take extra miles without extra costs.

For instance, new Dodge *Power Giant* V-8's are the most powerful of the low-priced three. And that extra power lets you handle the ruggedest hauling jobs with less engine strain. Less strain means less wear and, of course, fewer repairs. Exclusive Power-Dome design delivers premium performance on regular gas, too. "I save money both ways", says Jim Ryder. "But more important, I know that my customers will be thoroughly satisfied with any Dodge *Power Giant* they lease."

Why not do as Jim Ryder did . . . check into the facts with your Dodge dealer. You'll find a Dodge *Power Giant* will pay off for you, whatever your business.

DODGE

PowerGiants

Most Power of the Low-Priced 3

Hardwood Group Adopts Rules

Proposed grading rules for Pacific Coast hardwoods were approved at a semi-annual meeting of the Northwest Hardwood Association held in Corvallis, Ore., April 6, and will now be forwarded to the National Hardwood Association for final acceptance. The national group will act on the recommendations of the Northwest group in June; if accepted, they would be in affect by the first of the year. Another feature of the meeting was a panel discussion of interior hardwood wall paneling. Moderator was Ward K. Richardson, The Richardson Co. of Oregon, Ltd., Falls City, Ore. Members included R. M. Howard, Weyerhaeuser Timber Co., Longview, Wash.; E. M. Olsen, J. O. Olsen Manufacturing Co., Eugene, Ore.; and A. E. Hurl, Oregon Alder-Maple Co., Willamina, Ore. Hardwood panels, both solid and glue-up were discussed, including production and drying problems.

The meeting was under the direction of president E. J. Nist, Seattle Box Co., Seattle, Wash.

Grading rules, as approved by the membership, follows:

General Rules

The rules shall be the official grading rules for commercial species, indigenous to the northwest belt and shall govern the measurement, sales and purchase of factory lumber by association members. These rules shall apply to green, dry, rough or surfaced lumber. The better face of boards in all thicknesses shall yield not less than the minimum percentage of cuttings required for the grade, the reverse side of the cuttings in all thicknesses shall be sound as defined in "sound cutting", or better, unless otherwise specified. No exception shall be made to these rules unless agreed to by the seller and the buyer and is specifically stated in the purchase order.

Selects and Better: Widths—4 inches and wider, of which 5% of 3-inch width is admitted. Lengths—random 4 feet to 8 feet or longer, of which 10% of 4-to 6-foot lengths are admitted. Minimum cuttings—4 inches wide by 3 feet long, or 3 inches wide by 6 feet long. There is no limit to the number of cuttings. This grade admits all boards of 1 foot and over, surface measure, that will yield not less than 83 1/3% of clear-face cuttings, the reverse side of the cutting sound as defined in "sound cutting", except that boards of 1-foot and over surface measure yielding not less than 83 1/3% clear-face cuttings on one face, the reserve side of the board grading not below No. 1 Shop. One split not exceeding in length the width of the board, or its equivalent in one or both ends, is admitted.

No. 1 Shop: Widths—4 inches and wider, of which 5% of 3-inch width is admitted. Lengths—random 4 feet to 8 feet or longer, admitting 10% of 4- to 6-foot lengths. Minimum cuttings—3 inches wide by 3 feet long or 4 inches wide by 2 feet long. There is no limit to the number of cuttings. All boards of 1 inch and over surface measure shall yield not less than 66 2/3% clear-face cuttings, the reverse side of the cutting sound as defined in "sound cutting". No pith or split, or a combination of both in the same board, shall exceed one-fourth the length of the board.

No. 2 Shop: Widths—4 inches and wider, of which 5% of 3-inch width is admitted. Lengths—random 4 to 8 feet or longer, admitting 10% of 4- to 6-foot lengths. Minimum cuttings—3 inches wide by 2 feet long. There is no limit to the number of cuttings. Admits boards of 1 inch and over surface measure that will yield not less then 50% clear-face cuttings, the reverse side of the cuttings sound as defined in "sound cuttings". No pith or split, or a combination of both in the same board, shall exceed one-third the length of the board.

No. 3 Shop: Widths—3 inches and wider. Lengths—random 4 to 8 feet or longer, admitting 15% of 4- to 6-foot lengths. Minimum cuttings—3 inches wide by 2 feet long. There is no limit to the number of cuttings. Admits boards of 1 inch and over surface measure that will yield not less than 33 1/3% of clear-face cuttings, the reverse side of the cuttings sound as defined in "sound cutting", or, 50% of clear and/or sound cuttings. Also admits board of 1 inch and over surface measure yielding not less than 66 2/3% of "sound cuttings". Split and pith outside of the required cutting not limited.

Lumber poorer in cutting percentage, or less in width or length than admitted in No. 3 Shop described above, shall be tallied and reported below grade.

Definitions

Cuttings: A portion of a board or plank obtained by cross-cutting or ripping or by both. A cutting shall be flat enough to surface two side to standard surfaced thicknesses after it has been removed from the board.

Clear-face cutting: A cutting having one clear face with the reverse side sound as in "sound cutting".

Sound cutting: A cutting free from rot, pith, shake and wane. It will admit sound knots, stain, streaks or their equivalent, season checks not materially impairing the strength of the cutting.

It was reported at the meeting that the grading rules for logs adopted more than a year ago are receiving general acceptance.

The next quarterly meeting of the group will be held July 20 at Bellingham, Wash.

AMERICAN CASE HISTORY #3

The old and the new at Cascades Plywood, Lebanon, Oregon. The old wooden bin is being dismantled.

everything but the "SQUEAL"

You have heard the old story telling how the meat packing industry recovers all of the hog but its squeal. That, also, is the story at Cascades Plywood, Lebanon, Oregon, with an assist from American Sheet.

When Cascades relocated its sanding department, adding additional sanding capacity to make it the largest single unit plywood plant in the world, American redesigned the existing blower system and installed new systems to accommodate the expanded sanding facilities.

Part of this new American system is pictured above . . . a modern steel storage bin with cyclones at the top which funnel the sander dust into bin.

The dust is metered out at the bottom of the bin. By means of a special American system the dust is fed directly into boiler fire boxes at the steam generating plant adjacent to the new storage bins.

The same American know how and fabricating facilities that have helped Cascades economically utilize waste materials can be applied to similar problems facing you.

AMERICAN MEANS EFFICIENCY

AMERICAN SHEET METAL WORKS, Inc.
Manufacturers of Blowers
920 NE Glisan Portland, Oregon BE 2-0111

MICRO SWITCH . . . FIRST IN PRECISION SWITCHING

How to make log handling and saw mill operations more automatic with small capital investment

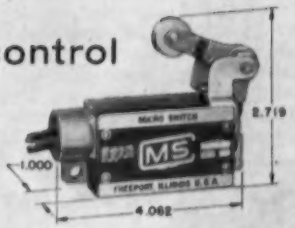
Mill equipment manufacturers and plant operators find MICRO SWITCH precision switches can increase profits. Call the nearest branch office for consultation with a MICRO SWITCH technical specialist

Feeler switch keeps hopper full

A western manufacturer uses MICRO SWITCH ML Type switches with a long feeler arm in a machine which adapts a paper converter so that it will handle cardboard cores on which tissue is wound. The hopper which feeds cores into the machine, has to be agitated so that the long cardboard cores will work their way down into the hopper. The switch detects when there are less than four cores in the narrow part of the hopper and starts the agitator going again. The MICRO SWITCH unit was chosen because of the low operating force (2½ oz. max.) required to move the finger arm.

The lever on this low force switch may be assembled to operate in either direction. It may be bent or shortened to fit the user's needs. This switch is available in both single-circuit (20 amps. 120, 240 or 480 v ac.) and double-circuit (10 amps. 120, 240 or 480 v ac.) contact arrangements.

Finger control for board saws



A manufacturer of an automatic 20-foot trim saw uses 11 Type LN switches per saw. Circular saws are placed at two-foot intervals. The LN switches are used in a finger control for manually controlling which saw will come down and cut the board. A series of rocker arms operate on the roller-arm actuator of the switch. Long life and convenient adjustability of the roller arm were important factors in the selection of this switch.

The LN is a general purpose limit switch which combines the features of precise operation, rugged construction and excellent sealing into one compact unit. The switch used in this application has an adjustable roller-arm actuator suitable for fast cam or slide operation. The roller arm is field adjustable through a vertical arc of 260°. The electrical rating is: 15 amperes 125, 250 or 460 v ac; ½ ampere 125 v dc; ¼ ampere 250 v dc.

Complete stocks of switches for plant application use are in the hands of distributors everywhere. Look under "Switches, Electric" in the Yellow Pages.

MICRO SWITCH
A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
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ALSO OUR COMPLETE MACHINE SHOP SERVICE

From Shavings to Veneer Chips

(*Continued from page* 63)

prescribed elevation, thus eliminating variations in thickness and weight which might be caused by wavey or cupped cauls. The mat continues and is slightly compressed as it moves under a pressure roll before reaching the point at which the top layer of fines is applied. With the top facing of fines in place a second roll presses the fiber down just before the caul-carried mat emerges from the felter enroute to press-loader and press.

Pressing Facilities . . .

involve another unusual feature. These consist of a 20-opening Baldwin 4 by 8 ft. hotpress flanked on one side by an elevator-type loader and on the other by an unloader of same make. As a result of simultaneous closing of each platen, pre-curing was eliminated in mats at the lower openings. This production problem was overcome by installing a pantograph (built by Washington Iron Works to Cascades design) on the press to close all 20 platens simultaneously. Low moisture content of the fiber, combined with high-temperature, high-pressure pressing, makes for rapid press cycles.

AT LEFT, A. E. Anderson, vice-pres. and plants mgr., Cascades Plywood Corp., and P. L. Kvale, newly appointed Lebanite Products Div. plant supt. (right) discuss present Lebanite Hardboard product. Kvale was with hardboard operations of Coos Bay Lumber Co., Coos Bay, Ore., and Western Nu-Ply, Inc., South Bend, Wash., and hardboard sales representative of Georgia Pacific Corp.

Properties of Lebanite

Lebanite is produced in thicknesses of 1/10, 1/8, 3/16, 1/4, 5/16 *and* 3/8-*in. within specific gravity range of* 1.06 *to* 1.10. *Both faces of the completed panels have a uniformly fine, close, light-color surface.*

Cascades also produces a high-density, high-resin particleboard of 1.12 *to* 1.18 *specific gravity for high-pressure decorative laminates, plywood overlays and other uses. This particleboard is produced in thicknesses of* 1/10 *to* 3/8-in. *and the company fills orders of any in-between thickness sanded to plus or minus* .005-in. *tolerance.*

Both the hardboard and particleboard are manufactured on the above-described production line. Each type panel is smooth-faced two sides and both made via the same process, except that the particleboard has higher resin content, higher density, and is homogeneous—only the hardboard is faced with fines.

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FROM LUMBER TO VENEER—
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Cost saving MOORE Equipment is specially designed. Whatever your problems in humidifying, heat treating, drying or handling of hardboard, softboard, lumber or veneer, let Moore engineers discuss these with you. There is no obligation!

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What's the Percentage in Feeding the Hog?

42.2% of an Average # 2 Sawlog is Wasted!

(Source of figures on request)

START A PRENTICE UTILIZATION PROGRAM NOW!

What do you mean by 'utilization"?

Ans: **Utilization means to turn wood waste into profit.**

Can all wood waste be utilized—sawdust, chips, shavings, scrap?

Ans: **Yes—all waste is reduced to fibers by hog treatment.**

How do I use these wood particles?

Ans: **You have two choices—mould them under pressure into useful, profitable by-products, or manufacture particle board for doors, paneling and other uses.**

What kind of products can I mould?

Ans: **Almost anything you can find a market for—paper roll plugs, cups and saucers, serving dishes and trays, shoe heels, saddle seats, chair legs, furniture parts, belt cores, etc.**

Does the Prentice Utilization Program require a large investment?

Ans: **No. The cost is surprisingly low compared to other utilization methods currently in use. Equipment for a moulding program is your quickest and lowest-cost entry into the utilization field. Later, you can install multi-platen equipment for particle board manufacture at somewhat higher cost—but still cheap in comparison.**

Write or phone . . . John Tyner — head of Prentice Utilization Department — and ask him for the Prentice Utilization Packet.

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Write us, or our nearest dealer . . . for complete details.

We operate our own Foundry

Stacker approaches truck and slips forks beneath the 19-ton log load.

Powered tusks are lowered over the logs and the entire load is lifted smoothly from truck. Truck is ready to move out within five minutes after it arrives.

LETOURNEAU Log Stacker Saves for North Carolina Mill Company

There was a dry-land log jam in the L. R. Foreman and Sons Lumber Co. mill at Elizabeth City, North Carolina, until Clay Foreman, in charge of yard operations, purchased a 25-ton Log Stacker to clear it up. The jam was caused by 65 trucks a day arriving at the scaling and decking area. These were unloaded by a crane — one log at a time so that each log could be scaled as it came off the truck — then re-loaded on a shuttle truck which fed the sawmill.

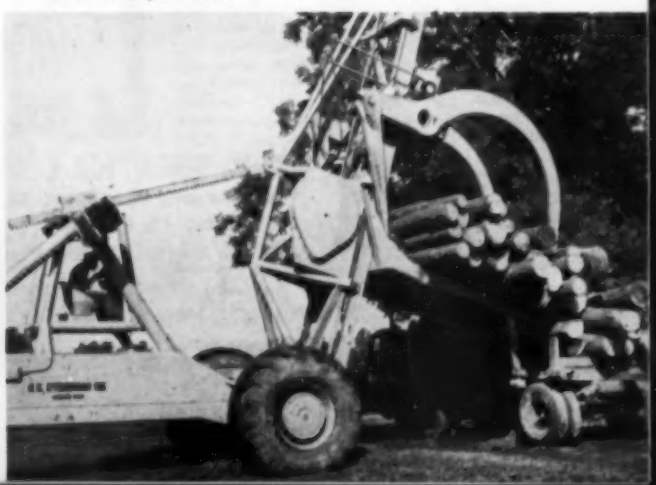
Stacker breaks up "Log Jam"

Since they put a LeTourneau Log Stacker to work the Foreman Mill crew gets logs off of incoming trucks and on their way to the sawmill in less than HALF THE TIME previously required. The mill owners figure the machine saves them around $2,000 every month.

This is the way they handle the job now: As soon as one of the 15-to-19-ton loads of poplar, cypress or yellow pine arrives, the LeTourneau Log Stacker moves right in, slips its forks under the logs, brings the big steel tusks down to clamp them tightly and takes the entire load off in one "bite." While the empty truck moves out of the yard, the Stacker carries the logs to a decking area and rolls them neatly onto the ground for individual scaling. This keeps trucks moving through the yard with no tie-

Decks are built in record time by the Log Stacker, which can deck to a height of 20 feet.

Logs gathered from the ground or picked from decks are quickly loaded onto yard trucks.



Stacker rolls logs on the ground for scaling, then gathers them up again for decking or reloading.

$2,000 a month

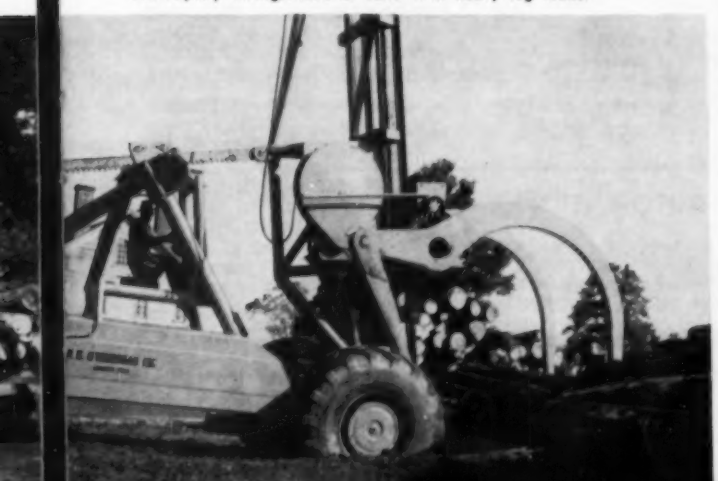
ups for single-log unloading and scaling.

As soon as a "stacker-size" load has been scaled, the operator uses the machine's driving power to push the logs into a pile. Then the Stacker picks them up and either takes them directly to the mill or puts them in a deck for storage . . . all this between the arrival of trucks to be unloaded.

Pays off on Less-than-Capacity Loading

"Our loads are normally less than the Stacker's capacity . . . but the extra power in reserve gives us a good, fast operation; and it's nice to have extra capacity available when we need it," Mr. Foreman said. "We think it's a very profitable machine for our size operation."

Extra wide tires and powerful Electric Wheels move the Stacker safely and rapidly through mud or sand with heavy log loads.



Diesel-Electric Power does the job

One LeTourneau Log Stacker and one operator will do ALL the log handling jobs required in most mill yards. This machine's exclusive power system — the LeTourneau system of Electric Power and Control — puts giant power to work wherever it is needed . . . unloading, sorting, decking, re-loading, feeding mill pond or table. Locally-placed electric motors and gear reductions do the work; a big diesel-electric generating set supplies the power; simple finger switches control every movement. Powerful LeTourneau Electric Wheels with huge rubber tires provide quick mobility to all parts of the yard . . . even those "inaccessible" to other machines because of sand or mud and ruts.

Get the Facts and Figures

from your LeTourneau Distributor on how a LeTourneau Log Stacker can cut costs in handling heavy log loads around your mill yard. Ask him to show you one at work. Mail the coupon today for literature and the name of the LeTourneau distributor nearest you.

Since 1929 — R. G. LeTourneau, Inc., has built BIG equipment for 28 years under the same corporate structure. In 1953 LeTourneau sold part of its business, retaining plants in Longview, Texas, and Vicksburg, Miss. Today LeTourneau creates and produces electrically powered and controlled equipment for logging, land clearing, and off-road transportation.

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LOGGING EQUIPMENT DIVISION

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R. G. LeTOURNEAU, INC.
Logging Equipment Division
2545 South MacArthur
Longview, Texas

Please send folder describing the Log Stacker.

Name_____ Title_____

Address_____

Firm_____

City_____ State/Province_____

L-140

SPA Holds Sessions

(*Continued from page* 112)

men on the deck and there are similar mills with no men on the deck, the 'Automation Potential' is 4-0 equals 4. The 'Automation Potential', multiplied by the average annual wage paid to these men, equals the margin the mill operator is spending above competitive mills to get the same job done. Even a $3000 cost differential may mean the difference between staying in business and shutting down in a small operation. For a large operation, the differential is higher.

"Most of the mills considering automation are still in the position of having to mechanize their operations first. Automation is the use of machines to control other machines."

Russell Bell, Safety Director, The Crossett Company, Crossett, Arkansas, said the lumber industry has the highest frequency rate year after year than any industry. Mr. Bell said there was obvious need for accident prevention which could be a big factor in cost reduction. As a typical example, he cited the experience of his own company, which has incorporated safety programs into its overall training of foremen and supervisors. "This," he said, "resulted in a 400% reduction in the cost to the company from accidents in only a two-year period.

Exposition Previews Automation and Utilization

PRIMARY RESULTS of the exposition was on the various processes of mechanization, automation and total utilization. Some 90 exhibitors displayed their products. *Mechanization displays* included crawler type tractors with land clearing attachment and small pneumatic tire equipment for use in planting seedlings. Also shown were lumber handling machines.

Harvesting equipment included power saws of every type, tree girdling and limb pruning power units, log handling and log loading machines, automatically controlled log carriages, high speed skidders, pulpwood handling loaders, push button log deck equipment, gang saws, new planers and lumber sorting equipment.

Total utilization was previewed in the form of log barkers, both portable and stationary, slab barkers, chipping equipment, briquetting machines, finger jointing equipment and saw filing equipment.

SPA Committee Reports

RESEARCH

- Recommended continuation of paint exposure tests of commercially available paints on Southern Pine, following the procedure used with 16 paints which were exposed in Miami for 2 years.
- Recommended that an effort be made to enlist the cooperation of paint manufacturers in developing the ideal formulation for Southern Pine.
- Reviewed preliminary reports of tests made on laminated 1x4's, which are inconclusive and point to the need for further study as to the strength and glue bond requirement.
- Considered a proposal by the Timber Engineering Company on the "Development of Minimum Requirements For End Glued and Laminated Southern Pine 2x4 Studs." Purpose of tests is determination of strength properties necessary in 2x4 stud members and the development of requirements as to the type and durability of adhesives and plant testing procedure.
- Considered need for supporting data as to the advantages from a performance and economic standpoint of Southern Pine decking and lining for box cars in relation to steel decking and plywood lining.

HOUSING SPECIFICATIONS

- Committee function is to provide a better understanding of the basic standards of the industry and to counsel with FHA on any problems relating to the carrying out of its minimum requirements for lumber. Because it is being recognized that SPA's concern is the enforcement of the reasonable minimum standards of the FHA and VA, the committee has been asked by them in some areas to extend its help. It has also met with groups of dealers at several points in Florida.

TRADE PROMOTION

Accomplishments during the year include production of a sound-color motion picture "Built for Living," now in circulation and encouraging progress in the important field of wood school construction, with respect to insurance rates.

An SPA educational program has been started among all Southern Pine manufacturers, appealing to them to pay closer attention to better manufacture, grading and seasoning and to the eye-appeal value of their product.

Southern Pine Industry Committee Opposes Wage Hikes

SOUTHERN PINE MANUFACTURERS reaffirmed their stand on legislative matters at a session of the Southern Pine Industry Committee held on April 9 in New Orleans. Chairman W. S. Fox, W. S. Fox & Sons, Pine Bluff, Ark., presided.

Decisions were made to:

- Oppose the Fair Labor Standards Act and the regulation of wages and hours by the Federal government.
- Oppose extended coverage of the Act.
- Favor the enactment of legislation that guarantees the rights of states under the Constitution, by which local Right to Work laws at the state level are respected and protected.
- Favor enactment of legislation to repeal the Walsh-Healey Act.

Chairman Fox reported that documented evidence was available showing that of more than 100 mills that have shut down, 35 of these gave higher labor cost as either the sole reason, or as a contributing factor.

KENNETH SMITH, The Pacific Lumber Co., San Francisco, Calif., called for the lumber industry to win more public understanding of its economic system, by devoting time and energy to this job.

Mr. Smith stated that:

- Money is tight not because the Federal Reserve raised the rediscount rate, but because capital spending is consuming money faster than savings are replacing it.

New Officers

Southern Pine Industry Committee

CHAIRMAN: W. S. Fox, W. S. Fox & Sons, Pine Bluff, Ark.

VICE-CHAIRMAN LEGISLATION: Ed Leigh McMillan, McMillan Mill Co., Brewton, Ala.

VICE-CHAIRMAN, GOVERNMENT RELATIONS AND PROCUREMENTS: J. T. Fleishel, Fleishel Lumber Co., St. Louis, Mo.

SECRETARY: S. P. Deas, New Orleans, La.

- Capital formation is just not sufficient to support the present rate of capital expenditures. Sources of risk capital are being dried up by unrealistic taxation.
- Federal Reserve restraints are necessary to keep inflation from assuming runaway proportions. The necessary across-the-board restrictions, however, leave credit rationing to the banks and in spite of their best efforts the impact is bound to be uneven. Home builders will be hurt more than others because of FHA and VA holding maximum rates on insurable loans below the market rate.

Resolutions adopted were:

- To petition Congress and the Armed Forces to reaffirm its policy of using productive forest lands for defense purposes only as a last resort.
- To advocate the highest possible

(*Continued on page* 142)

SAWMILL AUTOMATION IS HERE, TODAY!

You don't need to wait till tomorrow for the high productivity machines to help you beat today's tight market. Mater sawmill equipment is completely automatic. Inquire about Mater automated decks, automatic carriages, trimmers, mechanization conversion kits, feeds, tapers, labor savers.

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You'll see when you touch it—Friden model ABY is far advanced over all other machines at or near its price! A complete adding-multiplying machine no office can afford to be without. Plainly labeled control keys give direct "live" response. Totals and sub-totals obtained instantly with no extra strokes. Direct credit balance or minus total. Clear signal prints automatically. All negative amounts printed in red. Simplified ribbon and paper change. Ask your nearby Friden Man to show you *Natural Way* adding soon!

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Operating Data for Particle Board

	FLAT PRESSED	EXTRUDED
Yield from wood	80 to 95 per cent	80 to 95 per cent
Yield from non-wood fibrous raw materials	65 to 85 per cent	65 to 85 per cent
Chemicals:		
a. Resin	4 to 15 per cent (40 to 150 kg.) (on dry wt. of board)	5 to 8 per cent (50 to 80 kg.)
b. Sizing materials	0.2 to 0.5 per cent (2 to 5 kg.) (on dry wt. of board)	0.2 to 0.5 per cent (2 to 5 kg.) (on dry wt. of board)
Power	160 to 300 kwh per m. ton	110 to 150 kwh per m. ton
Fuel [1]		
a. For drier	0 to 150 kg. per m. ton	0 to 150 kg. per m. ton
b. For pressing	50 to 70 kg. per m. ton	20 to 30 kg. per m. ton
Water:	Negligible	Negligible
Labor—man hours [2]	7 to 30	3 to 4
Installed hot press	5 ft. x 10 x 15 openings	4 ft. 2 in. wide (127 cms)
Investment per daily ton [3]	US $16,000 to $30,000	US $12,000 to $15,000

1—As fuel oil
2—For medium size plant depending upon degree of mechanization
3—For a highly-mechanized plant, including mill service

Operating Data for Insulation Board and Hardboard

INSULATION BOARD

Yield from wood:	70 to 95 per cent
Yield from non-wood fibrous raw materials:	60 to 75 per cent
Chemicals for sizing:	
a) Paraffin wax, resin size	1.0 to 1.5 per cent (on dry weight of board)
b) Aluminum sulphate	1.0 per cent (on dry weight of board)
Power:	550 to 650 kwh per metric ton
Steam:	4 to 4.5 per metric ton
Water:	10 to 20 m^3 (2200 to 4400 Imp. gals) per m ton
Labor:	6 to 8 man hrs. per metric ton
Width of board forming machine	8 ft./12 ft.

Investments: US $30,000 to US $32,000 per daily ton (basis: 80 to 90 m tons per day mill)

HARDBOARD

Yield from wood:	70 to 95 per cent
Yield from non-wood fibrous raw material:	60 to 75 per cent
Chemicals for sizing:	
a) Paraffin wax or resin size	0.5 per cent (on dry weight of board)
b) Aluminum sulphate	0.5 per cent (on dry weight of board)
Power:	500 to 600 kwh per metric ton
Steam:	3.0 to 3.5 per metric ton
Water:	10 to 40 m^3 (2200 to 8800 Imp gals) per metric ton
Labor:	6 to 8 man hrs. per metric ton
Installed hot press:	4 ft. x 18 ft. 20 to 25 openings

Investment: US $28,000 to US $30,000 per daily ton (basis: 80 to 90 metric ton per day mill)

Particle Board Industry Organizes

American particle board manufacturers recently established their own national industrial organization, The Particle Board Assn. This supercedes two former associations in the field. A. F. Habig, of The Jasper American Corp., Jasper, Ind., is president of the association.

To effectively solve both regional and national factors, the organization was established on a divisional basis. The Western division, of which Kenneth Guenther, Pope & Talbot, Inc., Oakridge, Ore. is chairman, includes the 11 western states; Eastern division, with B. B. Lane, The Lane Co., Altavista, Va. as chairman, includes eastern portion of Texas, all of Arkansas, Kentucky, West Virginia, Pennsylvania and states farther east; Central division, chairmanned by B. F. Swain, Jr., Swain Industries, Seymour, Ind., includes the entire region between the eastern and western divisions.

Mr. Guenther states the main objectives for forming the associations are specified in the by-laws as follows: To afford the members—opportunity to consider and deal with the common problems of the industry; to secure cooperative action in advancing the common interests of members, and promote activities to conduct itself with the greatest economy and efficiency.

He says the group's aims include the promotion of product standardization and simplification, establish nomenclature, develop quality control standards and methods, trade promotion, collect and disseminate data, promote public relations, carry on research and generally represent the industry.

An active committee has already been appointed to establish commercial standards for wood particle board. Members of the committee are: T. J. Connelly, Dixie Chipboard Co., Chicago; E. W. Davidson, The Lane Co., Altavista; David A. Haile, Rock Island Millwork, Rock Island, Ill.; Hobert O. McQueary, Willamette Fibre & Chipboard, Sweet Home, Ore.; B. E. Mikulka, Love Wood Products of Texas, Diboll, Texas, and Mr. Guenther, committee chairman.

Coast-to-coast membership now includes 21 firms.

• The three most important parts of the house, says the Southern Pine Association, are the joists that support the floors, the studs supporting the walls and the rafters which carry the weight of the roof. They are all made with lumber, and when the lumber is "dry" there's an extra safety factor in added stiffness and strength.

The Complete Indispensable

FORESTRY HANDBOOK

Editor: *Reginald D. Forbes*, **Consulting Engineer**;
Staff Editor: *Arthur B. Meyer*, **Editor, "Journal of Forestry"**

In one volume—all the working methods, techniques, and vital data of on-the-ground forestry as practiced in the U.S. and Canada. Handbook organizes the essential facts of forest management, silvics, silviculture, watershed management, and all other related subjects. Includes information on the fundamentals of forest usage and protection as well as the latest developments in range management, soil development, communications, etc. **"A working handbook for those with a professional or commercial interest in the forest lands and crops of North America."** *American Forests.* Edited for the Society of American Foresters. Over 140 Contributing, Consulting Editors.

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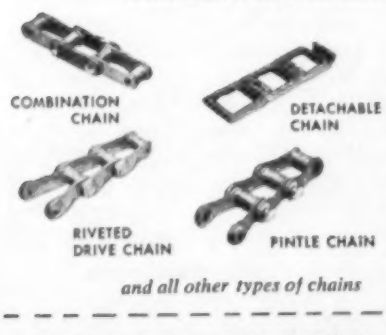

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NEVADA, Las Vegas, Las Vegas Mach. & Engr. Co.
NEW MEXICO, Albuquerque, Harry Cornelius Co.
UTAH, Salt Lake City, Lundin & May Foundry Co.

R. C. ACTON & ASSOCIATES, 901 E. Excelsior Ave., Hopkins, Minn.
IOWA, Des Moines, Globe Mach. & Sup. Co.
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THOMAS S. GLAZEBROOK, P.O. Box 4193, Columbia, S. C.
NORTH CAROLINA, Lenoir, Blue Ridge Howe. & Sup. Co.; Rocky Mount, Carolina Mach. & Sup. Co.; Mount Airy, Currier-Withers Sup. Co.; Gastonia, Gastonia Mill Sup. Lexington, General Transmission Sups.; Roanoke Rapids, Industrial Distr. Inc.; Charlotte, Industrial Howe. & Sup. Co.; Matthews-Morse Sales Co.; Wilmington, Mill & Contractors Sup. Co.; Greensboro, Odell Mill Sup. Co.; Salisbury, Piedmont Mill Sup. Co.; Burlington, Sykes Supply.
SOUTH CAROLINA, Greenville, Carolina Sup. Co.; Charleston, Charleston Sup. Co.; Columbia, Columbia Sup. Co.; Spartanburg, Crawford Mill Sup.; Greenwood, Dixie Howe. & Mill Sup. Spartanburg, Hall & Co.; Florence, O'Brian-Mace Co.; Waterboro, Simmons Diesel & Equip. Co.; Sumter, Sumter Machy. Co.; Columbia, Thackston-Davis Sup. Co.
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MASSACHUSETTS, Needham Heights, Bacock Equip. Co.; Cambridge, Lewis Tracy Co.
RHODE ISLAND, Providence, James A. Starck

JOHN A SHOEMAKER, P.O. Box 306, Ardmore, Pa.
MARYLAND, Hagerstown, Hagerstown Equip. Co.
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NEW YORK, N. Y. City, Congro Transmission Co.; Rochester, H. M. Cross; Hicksville, The Long Island Transmission; Syracuse, Sawyer Eng. Co.; Albany, Transmatic Equip. Co.; Lockport, Ward Bros. Mill Sup.
OHIO, Cincinnati, Cincinnati Transmission Co.
PENNSYLVANIA, Philadelphia, Lindsay, Oberholzer & Co.; Muncy, Sprout Waldron Co.
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WISCONSIN, Madison, Richard Ela Co.
HAWAII, Honolulu, P. S. Pell Co., Ltd.

Warehouse Stocks Available for Immediate Delivery

MOLINE MALLEABLE IRON CO., ST. CHARLES, ILLINOIS

Log & Lumber Prices

Columbia River Log Prices

Douglas Fir Peelers: No. 1 $114-119; No. 2 $104-109; No. 3 $81-86.
Douglas Fir Sawlogs: No. 1 $67-72; No. 2 $58-63; No. 3 $47-52.
Hemlock: Peelable $60-65; No. 1 $53-58; No. 2 $42-47; No. 3 $38-43.
White Fir: Peelable $63-68; No. 1 $58-63; No. 2 $53-58.
Noble Fir: Peelers $63-68; No. 1 $58-63; No. $50-55; No. 3 $37-42.
Cedar: No. 1 $64-69; No. 2 $41-46; No. 3 $35-40.
Spruce: Select $106-111; No. 1 $85-90; No. 2 $43-48; No. 3 $36-42.

Grays Harbor Log Prices

Douglas Fir Peelers: No. 1 $113-118; No. 2 $98-103; No. 3 $88-93.
Douglas Fir Sawlogs: No. 2 $63-68; No. 3 $38-43.
Hemlock: Peelable $59-64; No. 1 $54-59; No. 2 $43-48; No. 3 $40-45.
Cedar: No. 1 $79-84; No. 2 $45-50; No. 3 $38-43.
Spruce: Select $88-93; No. 1 $63-68; No. 2 $45-50; No. 3 $42-47.
White Fir: Peelable $59-64; No. 1 sawlogs $54-59; No. 2 $45-50; No. 3 $43-48.

Puget Sound Log Prices

Douglas Fir Peelers: No. 1 $109-114; No. 2 $99-104; No. 3 $85-90.
Douglas Fir Sawlogs: No. 1 $62-67; No. 2 $57-62; No. 3 $47-52.
Hemlock: Peelable $60-65; No. 1 $53-58; No. 2 $45-50; No. 3 $40-45.
White Fir: Peelable $61-66; No. 1 $54-59; No. 2 $43-48; No. 3 $37-42.
Cedar: No. 1 $83-88; No. 2 $47-52; No. 3 $35-40.
Spruce: No. 1 $58-63; No. 2 $40-45; No. 3 $38-43.

British Columbia Log Market

Reported by C. D. Schultz & Co., Ltd., Vancouver, B. C., consulting foresters and engineers.
(Log prices are per thousand feet board measure.)

FIR—Log stocks very low. Demand steady. Price range now $52.50 to $62.50 for #3's, $62.50 to $72.50 for #2's and $72.50 to $82.50 for #1's.

Peeelr price has decreased slightly to $82.50 to $92.50 for #3's, $92.50 to $102.50 for #2's and $102.50 to $112.50 for #1's.

CEDAR — Stocks gradually increasing. Shingle cedar price $35.00 to $45.00 for #3's, $45.00 to $52.50 for #2's and $52.50 to $62.50 for #1's. Little demand for lumber cedar and price is now $57.50 to $62.50 for #2's and $62.50 to $72.50 for #1's. Tie cedar remains steady at $42.50.

HEMLOCK & BALSAM—Log stocks are steady. Hemlock price range $35.00 to $40.00 for #3's, $40.00 to $45.00 for #2's and $45.00 to $50.00 for #1's. Balsam price is now $30.00 to $40.00 for pulp with very few sales of sawlog or peeler type logs.

• Southern Pine Prices (KD Stock)

		BB	C	D
Vertical Grain Flooring				
1x4		205.00	200.00	195.00
Flat Grain Flooring				
1x4		155.00	150.00	130.00
1x6		175.00	165.00	125.00
Drop Siding				
1x6	No. 106	191.00	170.00	130.00
	No. 116	191.00	170.00	130.00

Boards & Shiplap	1x6	1x8	1x10	1x12
No. 1	125.00	125.00	125.00	175.00
No. 2	82.00	84.00	81.00	93.00
No. 3	68.00	70.00	71.00	68.00

No. 1 Dimension	12	14	16	18	20
2x4	100.00	100.00	102.00	118.00	123.00
2x6	100.00	103.00	101.00	115.00	120.00
2x8	97.00	96.00	96.00	115.00	120.00
2x10	110.00	108.00	110.00	120.00	125.00
2x12	125.00	112.00	115.00	145.00	150.00

No. 2 Dimension					
2x4	94.00	96.00	98.00	107.00	113.00
2x6	86.00	88.00	86.00	100.00	105.00
2x8	84.00	85.00	84.00	97.00	105.00
2x10	88.00	91.00	88.00	105.00	109.00
2x12	90.00	88.00	90.00	115.00	120.00

• Douglas Fir Plywood

¼" AD SOIS .....$72/M sq. ft.

• Red Cedar (industry standard) Shingles

Royals			
No. 1	24"	4/2	$15.50
No. 2	24"	4/2	9.50- 10.50
No. 3	24"	4/2	5.00
Perfections			
No. 1	18"	5/2¼	11.50
No. 2	18"	5/2¼	7.75
No. 3	18"	5/2¼	3.50
XXXXX			
No. 1	16"	5/2	10.25
No. 2	16"	5/2	6.25
No. 3	16"	5/2	3.50- 4.00

• Douglas Fir Lumber Prices

1x8	Utility S4S KD	$ 48- 53.00
2x4	Construction Dimension S4S KD	84- 86.00
1x4	C&Btr VG Flooring KD	170-175.00
1x6	C&Btr Drop Siding KD	158-163.00
1x6	C&Btr S4S KD	170-175.00
1x8	C&Btr S4S KD	170-175.00
1x10	C&Btr S4S KD	170-175.00
1x12	C&Btr S4S KD	215-220.00
	CONSTRUCTION Timbers and Plank	
3x12	6x20'	$ 84- 87.00
3x12	22x24'	89- 92.00
3x12	26-32'	97-102.00
4x4	8-20'	85- 88.00
4x4	22-24'	90- 93.00
4x4	26-32'	98-103.00
6x6	8-20'	82- 85.00
6x6	22-30'	89- 92.00
6x6	32-40'	104-107.00
8x8	8-20'	81- 84.00
8x8	22-30'	86- 89.00
8x8	32-40'	101-104.00
6x10, 8x10, 10x10, 12x12	8-20'	81- 84.00
6x10, 8x10, 10x10, 12x12	22-30'	86- 89.00
6x10, 8x10, 10x10, 12x12	32-40'	101-104.00
Crossties		58- 61.00
	CONSTRUCTION Dimension (Green)	
2x4	6-24'	$ 71- 74.00
2x6	6-24'	72- 85.00
2x8	6-24'	71- 74.00
2x12	6-24'	72- 75.00
	STANDARD & Btr. Boards (Green)	
1x4	6-20'	$ 49- 52.00
1x8	6-20'	61- 64.00
1x12	6-20'	61- 64.00

Western Pine Prices

The following F. O. B. mill prices, based on Past Sales, were reported to the WESTERN PINE ASSOCIATION by members during the period 4/22 to 4/27/37 inclusive. Both direct and wholesale sales are included and are based on specified items only. They are for dry surfaced lumber.

PONDEROSA PINE

SELECTS S2 or 4S	4/4RW	5/4RW	6/4RW
C Select RL	$264.27	$262.87	$263.31
D Select RL	195.01	202.38	190.95
SHOP S2S	No. 1	No. 2	
5/4	132.04	100.68	
6/4	133.91	101.13	
COMMONS S2 or 4S	No. 2	No. 3	
1x8" RL	103.88	73.95	
1x12" RL	115.14	79.01	
4/4 No. 4 Common S2 or 4S	53.16		

IDAHO WHITE PINE

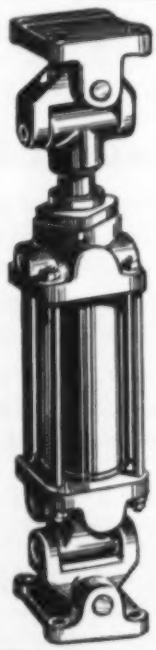
SELECTS S2 or 4S	4/4RW	6/4RW	
Choice (C) RL	270.56		
Quality (D) RL	198.16	259.13	
	Colonial	Sterling	Stand.
COMMONS S2 or 4S	No. 1	No. 2	No. 3
1x8" RL		152.07	100.72
1x12" RL		165.39	102.13
4/4 UTILITY (#4) S2 or 4S RW&L	60.14		

SUGAR PINE

SELECTS S2 or 4S	4/4RW	5/4RW	6/4RW
#1 & 2 Clear RL	281.56	278.98	283.92
C Select RL	272.07	269.91	274.84
D Select RL	256.55	207.54	206.16
SHOP S2S	No. 1	No. 2	No. 3
5/4	141.08	104.69	72.47
6/4	140.41	105.75	72.67
8/4	159.82	115.43	75.33

LARCH-DOUGLAS FIR

4/4 #3 Common S2 or 4S	69.13
2x4 #1 Dimension RW&L	81.99
2x4 #2 & Btr. Dimension RW&L	70.24



air power to spare!

Dogging a log, operating a swing saw, or the lifting of transfer chains can be done with instant smoothness and perfection when HANNA AIR CYLINDERS are the controlling force. These power pushing devises dispose of eccentrics, cam shafts, levers, wedges and screws. HANNA AIR CYLINDERS provide immediate, positive and unfailing response.

POWER TRANSMISSION PRODUCTS' engineers are available for consultation on your pushing, pulling and motion problems. Why not use their experience—contact them the easy way...by telephone.

Power Transmission Products

A DIVISION OF PORTLAND IRON WORKS
1107 N.W. 14TH AVENUE, PORTLAND 9, OREGON
Call CApitol 7-1271

Whether it's repair or replacement...

You'll find Ford Industrial Engine Service is available everywhere!

Know why so many industrial power users are swinging over to *Ford* power? One reason is service.

Ford power users *know* there's always a Ford Dealer nearby to give service when it's needed . . . to keep downtime at a minimum. And because Ford Dealers carry an inventory of the more commonly purchased engine parts, the Ford power user need never invest in a big parts inventory of his own.

Also, across the country, you'll find a network of newly established Ford Industrial Power Headquarters. Each is equipped to repower any type of equipment with dependable, low-cost Ford power.

It's the availability of service like this—wherever you are—that helps keep your operating costs *low*. If you are considering a new power unit or engine assembly—4-, 6- or 8-cylinder—see your Ford Industrial Products Dealer. He will be very happy to discuss your power requirements with you and make sure you get the one right power unit for *your* job. Write to the address below for further information.

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INDUSTRIAL ENGINE DEPARTMENT • FORD Division of FORD MOTOR COMPANY
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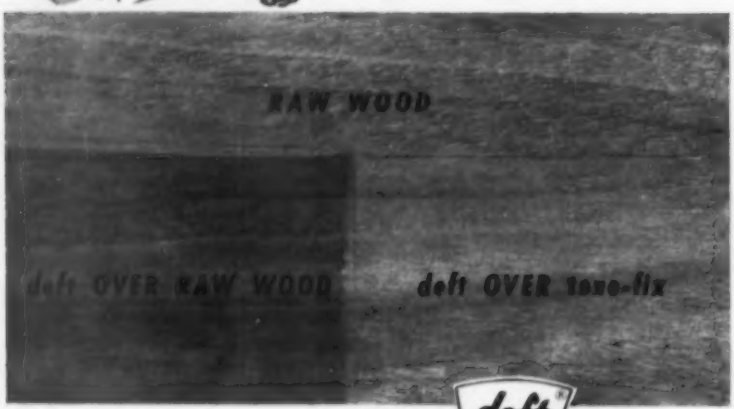
YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

Now...clear-finish LIGHT WOODS without that "amber" look



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RAW WOOD

tone-fix

Not since the introduction of Deft, has a wood finishing product received such instantaneous and enthusiastic acceptance.

Tone-fix is a first-coater that "sets" the raw wood tone... prevents the darkening, yellowing and color change normal to the wetting action of clear finishes. It holds the original wood tone without resorting to artificial bleaches, burning or pigmentation. Easily applied by roller, brush or spray. Use *Deft* over *Tone-fix* for a beautiful finish.

DEFT WOOD FINISH

may be used over Tone-fix or used alone. Deft seals, primes and finishes ...dries in 30 minutes, is completely trouble-free and will not darken with age.

Be GOOD to your WOOD... Deft-finish it or Tone-fix and Deft it.

Available from coast to coast wherever paints are sold, or write

DESMOND BROS., 1826 W. 54th St., Los Angeles • Factories: Los Angeles, Calif.; Alliance, Ohio

Tall Timber

(Continued from page 5)

ra and shipping magnate who was eager to develop lumber cargoes for his ships. The Koerners had arrived in Vancouver only a few years before and their Alaska Pine Co. had been successful from its inception.

As general manager of Western Forest Industries Limited, Mr. Gattie had a post which applied to his imagination and desire to create. WFI consisted, basically, of a sawmill at Honeymoon Bay, Cowichan Lake, previously owned by the Rounds-Hunter group, and logging operations at Gordon River and Meade Creek. Under Mr. Gattie's direction the mills were rebuilt and expanded and the logging operations converted from rail to truck, with many miles of road constructed. Due to the Carpenter interests, WFI has always been a self-contained unit affiliated with Alaska Pine Co. and when the latter was acquired by Rayonier, Inc. after the Koerners and Abitibi Power & Paper Co. had entered the pulp field, its individuality continued.

"IN THE TEN YEARS I have been living here permanently I have seen the lumber industry undergo a transition more complete and astonishing than anyone would have forecast," said Mr. Gattie, discussing this development with THE LUMBERMAN. "Many more changes are coming. An increasingly larger percentage of man's requirements will be furnished in a more highly processed state than a piece of sawn lumber. Lumber manufacture today is still a relatively primitive process; we simply use a band saw where our ancestors used a stone-headed axe."

Mr. Gattie foresees a big future for laminated beams and other structural material based on wood, and in processing he expects more and more automatic handling, especially as more uniform log sizes are cut. He looks for growing diversification in production, more automation when it can be applied on a practical basis, improvement in quality of product.

An intensely busy man, Mr. Gattie carries his responsibilities easily. He is not the worrying type, or at least gives no outward indication of it. In addition to his duties with WFI, he represents Alaska Pine & Cellulose on many forest industry associations, takes an active part in industrial relations and he has retained his affiliation with Bambergers Ltd. as the Canadian director. An enthusiastic gardener at his Angus Street home, he finds little time for golf at the Capilano club to which he belongs. Mr. and Mrs. Gattie have two daughters, both married. A brother, A. H. Gattie, is in the shipping business in Portland, Ore.

. . . Fluid Power news

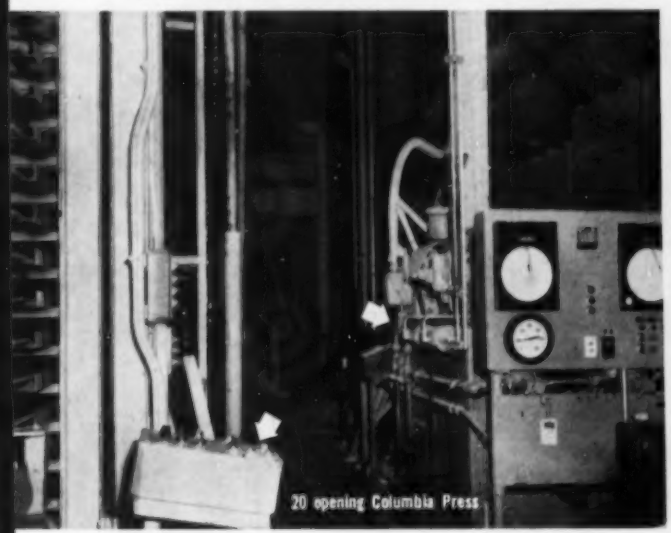
REPORT NO. 11,500 PACKAGED POWER FOR PRESSES

From Oilgear Application-Engineering Files

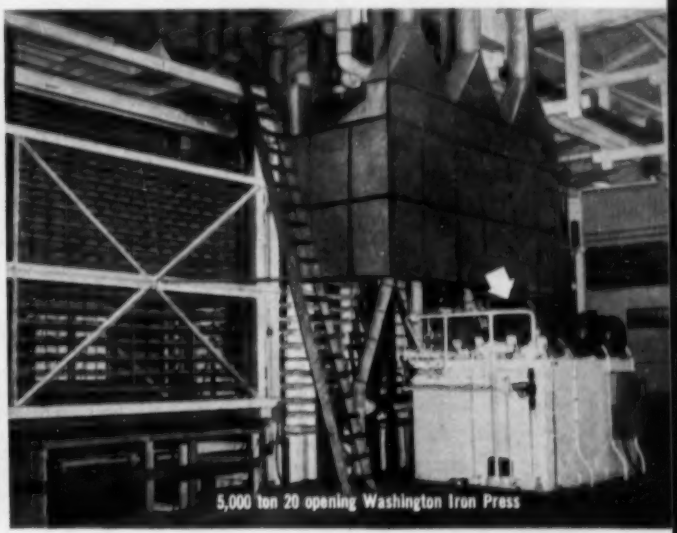
HOW OILGEAR SYSTEMS BOOST QUALITY PRODUCTION—CUT OPERATING COSTS

CUSTOMERS: *Many Modern Hot Plate Press Builders and Users (Names Withheld)*

DATA: For presses with capacities ranging from 500 to 5,000 tons, or two-press operation. It is desirable to have one company responsible for the entire power system, rather than an assembly of components of different origin. Should have remote, preset, accurate, automatic push button control of multiple time cycles, pressures, and ram speeds to improve quality—increase production. "Presets" to be simply, rapidly adjusted by user personnel. High speed platen approach and return needed to increase productive cycles per hour. Remote location of equipment to prevent absorption of heat from the press . . . with a minimum of piping to keep maintenance and installation costs to a minimum. Systems must be leak-tight, trouble-free, dependable, capable of virtually continuous operation.



20 opening Columbia Press

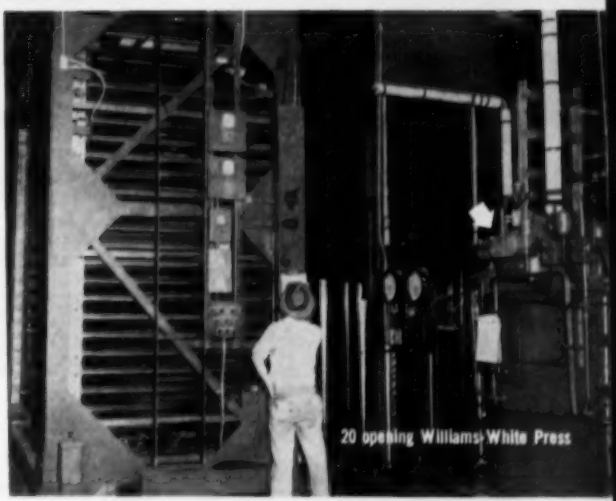


5,000 ton 20 opening Washington Iron Press

SOLUTION: Shown are three typical installations where Oilgear "Power-Paks" have been application-engineered by Oilgear—with the press manufacturers—to achieve the modern concept of high speed automatic production of hardboards and plywood. These are complete Oilgear Fluid Power systems that include pumps, motors, reservoir, valves, and controls custom-built into a single "Power-Pak." Oilgear "Power-Paks" offer many advantages other than a mere unitized assembly . . . automatic conservation of electrical power . . . precision-controlled, variable cycle times and board pressures—with a complete choice of controls ranging from manual to completely automatic, remote push button . . . high-speed platen approach and return . . . leak-tight welded fittings and pipe joints . . . completely pressure and flood lubricated by the oil in the system—assuring long, trouble-free, dependable life. Oilgear's complete "Power-Paks" eliminate costly hand-fitted assemblies, unnecessary engineering, excessive power loss, leaks, repetitive malfunctioning, "Christmas tree" appearance. Press manufacturers and users alike report . . .

"For the lowest cost per year—it's Oilgear!"

For practical solutions to YOUR *linear or rotary drive and control problems, call the factory-trained Oilgear application-engineer in your vicinity. Or write, stating your specific requirements, directly to . . .*



20 opening Williams-White Press

Oilgear application-engineered Fluid Power systems are not limited to linear drives for hot plate or pulp baling presses. They are highly successful on rotary drive applications as veneer clippers, sawmill carriages, feed rolls, resaws, gang saws, edgers, trimmers, log handling equipment, transfer systems, winders and calenders. For controlled, linear or rotary power—check with Oilgear!

THE OILGEAR COMPANY

Application-Engineered Fluid Power Systems

1562 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

FROM "HALF-DAY TO A FEW MINUTES" MARKS CHANGE FROM MANUAL TO LIFT TRUCK METHOD

Unit loads are stacked in popular sizes.

Handling broken lot orders.

WICHITA, KANSAS — Cumley Lumber Company (wholesale) converted from manual to mechanical handling with a Hyster 15,000 lb. capacity lift truck—with considerable savings in time and money.

According to the yard foreman, the company now can fill an order with the Hyster truck in a few minutes, which, using the old manual method of handling one board at a time, would have required half a day.

14-Foot Stacking

Cumley Lumber handles shingles, sheet rock, oak flooring as well as lumber. The Hyster 15,000-lb. lift truck loads materials onto trucks at a siding which is two miles from the lumber yard, then goes to the lumber yard to unload the trucks—stacking lumber as high as 14 feet.

Truck operator says, "I like the Hyster Truck better than any other make that I've ever driven. A Hyster truck handles easier and you can always see your load. You can't beat them . . . and I've been operating machines like this for five years."

Steel-Banded Load Units

Many of the boards are steel-banded into bundles for faster, easier handling — average unit loads weigh approximately 12,000 lbs. To expedite handling the truck's 4-foot forks are equipped with 2-foot extensions.

Your Hyster Dealer makes it his business to keep up with materials handling progress in the lumber industry. He can help you speed operations and lower costs. Call him today.

Unloading truck which was loaded at siding.

Call your Hyster Dealer today. He is listed in your telephone directory under "Trucks-Industrial"

HYSTER COMPANY

Hyster Industrial Trucks Increase Profits for Wholesale Lumber Yards

Factories: PORTLAND, OREGON
DANVILLE, ILLINOIS
PEORIA, ILLINOIS
NIJMEGEN, THE NETHERLANDS

Manufacture of Insulation Board and Hardboard On One Forming Line

By
A. W. MACKNEY

NEW ZEALAND FOREST PRODUCTS, Ltd., Aukland, New Zealand, makes both insulation board and hardboard in the one line. The hardboard is made in exactly the same manner as the insulation board except for a difference in chemical furnish and the addition of a dry pressing stage.

The plant consists essentially of Bauer pulpers, screening and deckering section, Oliver forming unit, Downington press and Coe drier. This equipment is of standard United States design but the hardboard pressing section involving pre-driers, press loader and unloader and wetting section are all of New Zealand design.

Some of the unusual features of the plant are the high production rate for the drying section, the electrically heated press section and the wetting method adopted for the conditioning of hardboard.

In comparing the process with other wallboard plants the most unusual features are the flotation method of bark separation, the electrically heated platens in the hardboard press which avoids the need for a high pressure boiler for the temperature range required, and the very drastic method of conditioning the board to equilibrium moisture content.

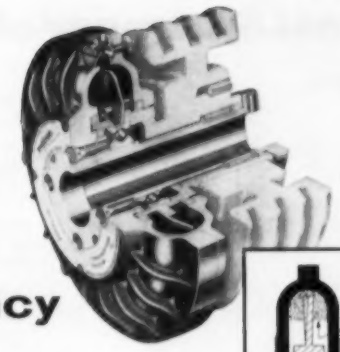
Approximately 20 per cent of the insulation board is treated with a single coat of flame resistant paint Albi-R, the amount of paint applied being sufficient to ensure a Class I rating in the British Standard Test for spread of flame. Paint is mixed from the dry powder components, applied by a coating roll equipped with a doctor roll, brushed out by three reciprocating brushes and immediately dried under infra-red lamps. Equipment is installed on the main production line between the drier unloader and the saws and avoids an additional handling operation.

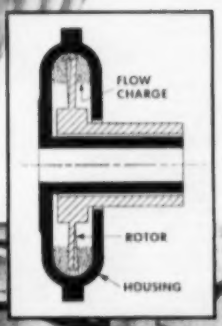
A range of decorative mouldings, acoustic tiles and decorative tiles is also produced. Where required two thicknesses of half-inch board are laminated to make certain types of mouldings and for one-inch thick acoustic tiles.

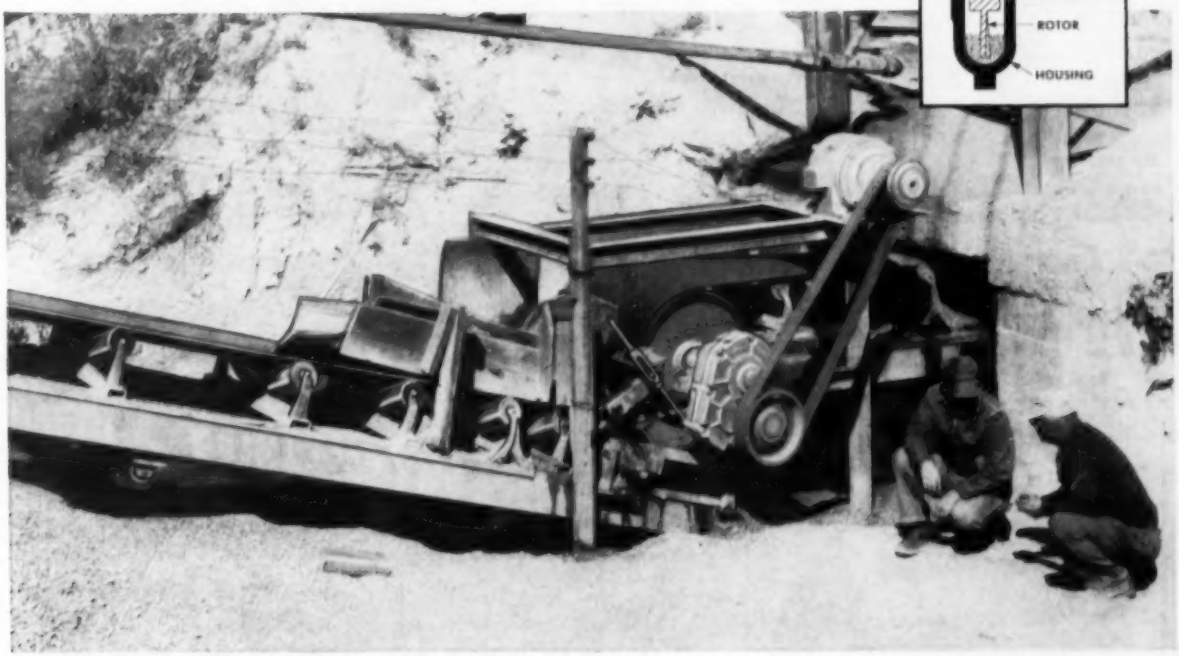
Tempered hardboard is produced by a conventional process of immersing board in drying oils followed by block stacking to give an uptake of oil above that used in the original manufacture of 5.5 per cent. Baking is carried out in small compartment kilns at temperatures up to 150° C. (300° F.), the total baking cycle requiring six hours.

Mr. Mackney is Gen. Supt., Penrose and Chief Chemist, New Zealand Forest Products Ltd., Auckland, N. Z.

This new drive starts loads smoothly... with smaller motors ...and gives 100% efficiency at full load!







FLEXIDYNE

THE DRY FLUID DRIVE

This tunnel conveyor, 225 feet long, handles 500 tons of sand and gravel per hour—8 to 16 hours a day.

With Flexidyne, the motor picks up the load easily and smoothly. Power investment is reduced, power costs cut, maintenance simplified and conveyor belts are protected against breakage.

Flexidyne, the Dry Fluid Drive, is the *new* development that starts loads smoothly, that protects against shocks and overloads, that saves power and that gives 100% efficiency at full load!

The "dry fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing, which is keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, wedging it between the housing and the rotor which transmits power to the load.

After a momentary slip between housing and rotor, the two become locked together and achieve full load speed without slip and at 100% efficiency during the running cycle. Changes in weather—hot or cold—inside or out—do not affect operation of Flexidyne.

Flexidyne is now available in 8 sizes—for use with electric motors and internal combustion engines from 1 hp to 300 hp. While each size is power rated, the flow charge can be varied at will to give tailor-made torque for your particular job. Write for Bulletin A-640.

DODGE MANUFACTURING CORPORATION
900 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.

DODGE
of Mishawaka, Ind.

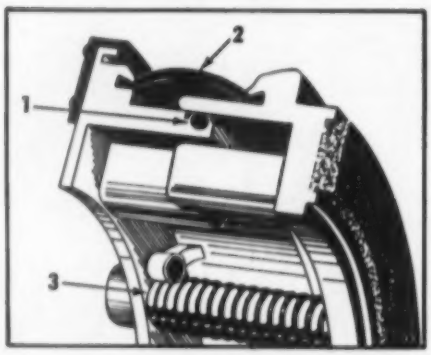
Regional Summary of Board Mills

Particle Board

	Existing	Under Const.
AFRICA	Existing	Under Const.
Northern Rhodesia	1	
South Africa	3	
Total	4	
EUROPE		
Austria	3	
Belgium	7	1
Bulgaria		1
Czechoslovakia	1	plants u. c.
Denmark	1	
Finland	1	2
France	12	7
Germany (Federal Republic)	42	plants u. c.
Germany (Eastern zone)	6	
Hungary	1	
Israel	1	1
Italy	5	
Netherlands	9	
Norway		3
Poland	2	
Romania		1
Saar	1	
Spain	1	
Sweden	2	2
Switzerland	9	
United Kingdom	7	1
Total	111	19
FAR EAST		
Formosa		1
Indonesia		1
Japan	7	
Thailand		1
Total	7	3
LATIN AMERICA		
Argentina		1
Brazil	1	
Chile		1
Colombia	2	
Mexico	1	
Uruguay	1	
Total	5	2
MIDDLE EAST		
Turkey	1	
Total	1	
NORTH AMERICA		
Canada	3	
USA	52	1
Total	55	1
OCEANIA		
Australia	1	
Total	1	
USSR		
Total		
GRAND TOTAL	184	25
	209	

Insulation Board and Hardboard

	Existing	Under Const.
AFRICA		
Northern Rhodesia		
South Africa	2	
Uganda	1	
Total	3	
EUROPE		
Austria	5	
Belgium	1	
Bulgaria		
Czechoslovakia	2	
Denmark	1	
Finland	8	
France	4	
Germany (Federal Republic)	8	
Germany (Eastern zone)	2	
Hungary	1	
Ireland	1	
Israel	1	
Italy	4	
Netherlands	1	
Norway	5	
Poland	4	
Romania		
Saar	1	
Spain	1	
Sweden	18	
Switzerland	3	
United Kingdom	3	
Yugoslavia	3	
Total	77	
FAR EAST		
Formosa	4	
Indonesia	1	
Japan	22	
Philippines	2	1
Thailand		
Total	29	1
LATIN AMERICA		
Argentina	1	
Brazil	2	
Chile		1
Colombia		1
Costa Rica	1	
Mexico	1	
Uruguay		
Total	5	2
MIDDLE EAST		
Turkey		
Total		
NORTH AMERICA		
Canada	12	1
USA	31	6
Total	43	7
OCEANIA		
Australia	3	2
Hawaii	1	
New Zealand	1	
Total	5	2
USSR	9	
GRAND TOTAL	171	12
	183	



Give Your Tractor Double Protection Against Final Drive Lubrication Loss

Sure-Seal®

FINAL DRIVE BELLOWS SEAL

Sure-Seal Features

- **Outer Bellows Seal impervious to grease and oil.**
- **Inner "O" ring seal gives double protection.**
- **Heat-treated springs hold leather and cork sealing faces tight without adjustment. Give long life, positive sealing against dirt and water.**

Sure-Seals protect your tractor against loss of final drive lubricant by using an inner seal in addition to the regular outer bellows seal. This extra seal is a neoprene "O" ring riding inside two metal flanges which prevents the lubricant from reaching the bellows. Protect your investment, guard against down time—install Sure-Seal Final Drive Bellows Seals with double protection. Made for Caterpillar D-4, D-6, D-7, D-8 and TD-24 tractors.

LOCKS GREASE IN—DIRT OUT

Sure-Seal Equipment Co. 1820 N.W. 25th AVE., PORTLAND 10, ORE.

ARMORBORD

The "*Performance-Engineered*" Hardboard

Standard ARMORBORD

In 8'0" length, 4'0" width; ⅛", 3/16" and ¼" thicknesses. Other sizes on order.

Perforated ARMORBORD

Standard punching in all standard thicknesses. For special effects and "working wall" installations.

Underlayment PANELS

Special ¼" x 4' x 4' underlayment ARMORBORD. Write for details on special features.

ARMORBORD is wood "performance-engineered" into large, grainless sheets which have both beauty and great structural strength. ARMORBORD is produced by the revolutionary "semi-dry" process which assures uniform texture and density, greater dimensional stability.

Consider its appearance. ARMORBORD is a pleasing light tan. It can be left unfinished for fresh, cheerful decorative effects . . . or it can be given any finish or surface treatment. ARMORBORD'S hard, glass-smooth surface is the perfect base for paint or lamination.

Consider its great strength. ARMORBORD is far denser and harder than ordinary wood. It is splitproof, abrasion and impact-resistant. Flexible, yet amply rigid when framed. Dimensionally stable. ARMORBORD can be worked with ordinary tools . . . or die-cut or punched for mass-production work.

Finally, consider its low cost . . . the speed with which it can be worked . . . ease of application . . . long-lived beauty.

MIXED CAR SHIPMENTS OF ARMORBORD HARDBOARD AND ARMORBOND PLYWOOD PANELS!

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SAWMILL & LOGGING EQUIPMENT

EDGERS. A complete line of both Stub Type and Table Type Edgers in a wide range of sizes are available.

TRIMMERS. Air and Wheel Type Trimmers for sawmill and planing mill application . . . available in the size to meet your need.

PRECISION LINEBAR FEED TABLES. Available for most all sizes and makes of new and existing band resaws.

HOISTS. Hoists available to handle a multitude of lifting and pulling jobs. Sizes for all-'round utility or extremely heavy log loading, lifting.

Special Machinery Made to Order

Recent Schurman deliveries

8" x 54" Edger to Burkland Lumber Co., Turner, Oregon
8" x 48" H.D. Edger to Barbee Mill Co., Kennydale, Wash.
DDH-20 Hoist to Salmon River Logging Co., Salmon, Idaho

SCHURMAN MACHINE WORKS, INC.

FACTORY OR FIELD INSTALLATION KITS for 3000 to 20,000 lb. Trucks

Swing-Shift speeds carloading up to 28%. Less damage to loads and fragile merchandise.

SWINGS and SHIFTS loads quickly into exact alignment without moving truck from original approach.

Operator *SWINGS and SHIFTS* loads (forks) while truck is moving—eliminates all lost motion.

See Your Lift Truck Dealer or Write--

Swing-Shift MFG. CO.
P. O. BOX 111 - L

The Biggest Little Hotel in

SAN FRANCISCO

Downtown . . . Geary at Powell
½ block to Union Square

Rates from
with bath **4.00** single

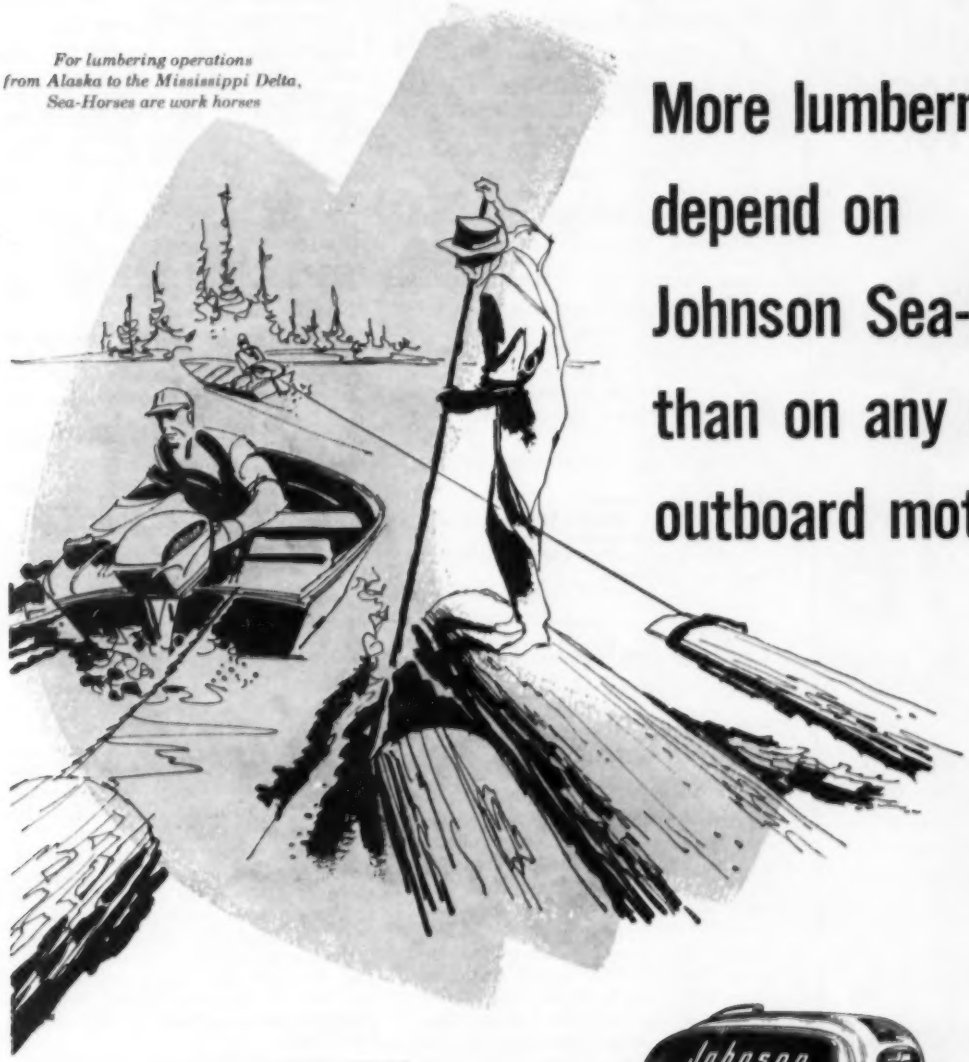
GARAGE SERVICE

HOTEL Franciscan

Telephone Douglas 2-2200

By advertising in **THE LUMBERMAN** you are able to communicate with your customers and prospects in an atmosphere that is natural to them and most productive for you. In this respect, today's reliable business press serves a purpose not duplicated or equalled by any other selling force.

For lumbering operations from Alaska to the Mississippi Delta, Sea-Horses are work horses



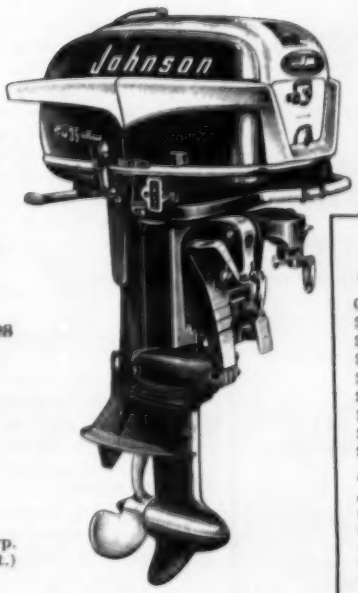
More lumbermen depend on Johnson Sea-Horses than on any other outboard motor

New for '57—"sweetest-running Johnsons ever"

There are two new power classes in our '57 line—with five load-loving Johnsons now delivering 18 or 35 hp. Nine new motors in all, each now equipped with a drive pin saving slip-clutch. And each protected against salt water corrosion, so no flushing is necessary.

Johnson leadership in commercial outboard sales and use stems from one fact . . . Johnson dependability. Hour after hour, year after year, Sea-Horses deliver the goods—at all speeds and under all conditions of load. See your Johnson dealer now. He's listed in the Yellow Pages.

FREE! 1957 Sea-Horse catalog, write: Johnson Motors, 211 Pershing Rd., Waukegan, Ill. (Div. of Outboard Marine Corp. In Canada: manufactured by Johnson Motors, Peterborough, Ont.)



FOR '57! A WIDE AND WONDERFUL CHOICE!

Golden Javelin*	35 hp.	$625
Sea-Horse 35*	35 hp.	585
Sea-Horse 35	35 hp.	495
Sea-Horse 18*	18 hp.	475
Sea-Horse 18	18 hp.	395
Sea-Horse 10	10 hp.	340
Sea-Horse 7½	7½ hp.	260
Sea-Horse 5½	5½ hp.	230
Sea-Horse 3	3 hp.	155

*12-volt electric starting (new quick-charging 10-ampere generator with automatic voltage regulator available as accessory on first two models). Prices f.o.b. factory, subject to change. OBC certified brake hp at 4000 rpm (18s and 35s at 4500)

A million Sea-Horse owners will tell you ***JOHNSON KNOWS BEST***

PERSONALIZED SERVICE

Since 1905

The Epperson men visit your premises, study your insurance needs and develop a custom-made insurance program that fits your requirements and budget.

Lumbermen's Underwriting Alliance

U. S. EPPERSON UNDERWRITING COMPANY, MGR.

E. M. Lynn, President

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Kansas City 6, Missouri

BRANCH OFFICES

509 Terminal Sales Bldg.
Portland, Oregon

1554 Yonge Street
Toronto 7, Canada

Lanewood—Extrusion Process

(*Continued from page 50*)

- Automatic cutoff saw prevents rehandling large boards for cutting to various sizes.

At present prices (1956), the equipment installed necessary to produce 800/1000 feet per hour of ¾-inch board are as follows:

Multi-platen process	$325,000 - $375,000
Vertical extrusion	$180,000 - $190,000
Horizontal Lanewood	$140,000 - $145,000

The multi-platen process will take at least three times the building area that the extrusion processes demand.

Best cost figures from reliable sources show the following cost comparison between the different processes:

Based on 3/4-inch boards—Boards of equivalent quality:

Multi-platen processes
$80.00 - $95.00 per M sq. ft.

Vertical extrusion process
$75.00 - $85.00 per M sq. ft.

Lanewood horizontal
$50.00 - $60.00 per M sq. ft.

Automation Keynotes Plant

(*Continued from page 48*)

scale in the conveyor feeding the resin mixer. In addition to setting the temperature of the kiln by controlling the intensity of the flame the instruments must also control dampers to admit an amount of air just sufficient to carry off the moisture driven from the material.

Delivery from the surge bin is controlled by the scale ahead of the dryer. The less homogeneous the material, the more difficult it becomes to apply automation.

Serious thought is now being given to designing into a plant, as an integral part, a small atomic reactor, one which would deliver between five and ten thousand kilowatts. In this way the plant could be made entirely self-sufficient.

In the future, processing plants will be built that will employ still newer aspects of automation technology; that will satisfy new economic requirements and that will produce still better products for the world's needs.

Continuous Humidifiers for Conditioning Hardboard

By
ARMIN A. WEHRLE

HUMIDIFIERS FOR CONDITIONING HARDBOARD can be classified in three types: continuous, semi-continuous and batch. Based on the experiences of the Georgia-Pacific Corporation hardboard plant at Coos Bay, Oregon, certain advantages are gained through the use of continuous humidifiers. These include lower operating costs, and faster humidification. Some designs require less floor space. The disadvantages of a continuous unit are loss of flexibility, higher initial cost and higher maintenance costs. The loss of flexibility can be minimized by the inclusion of multiple controls to give varying conditions simultaneously within the chamber. The initial cost should not overbalance the saving to be gained by low operating costs.

The design of any unit should be kept as simple as possible to keep the operation trouble-free and maintenance costs to a minimum. For a plant producing oil-tempered board, a continuous unit can be used by the inclusion of baking and cooling sections to the humidifying chamber. As this would increase the cost considerably, it probably would be more practicable to supplement the unit with a batch humidifier (in which baking, cooling and humidifying are carried out in one chamber), to handle the oil-tempered portion of the production.

Mr. Wehrle is associated with Georgia-Pacific Corp., Hardboard Div., Coos Bay, Ore.

Mahoney Appointed Officer

- George H. Mahoney has been appointed vice president and general manager of Pacific Coast Lumber and Imported Plywood and Hardwood operations for W. R. Grace and Co., Pacific Coast Division. Mr. Mahoney has been with the Grace organization for more than thirty years.

Grace's Northwest lumber buying activities will continue under management of Mr. Lowell E. Patton, with headquarters in Portland, Ore., lumber and hardwood sales under the management of Mr. Henri A. Muth and plywood sales and purchases under the management of Mr. Jan van Wyngaarden, with headquarters in San Francisco.

For EXTRA SAFETY
Convert to
Bendix-Westinghouse
AIR BRAKES
COMPLETE "DO-IT-YOURSELF" KITS...
LOW COST
Easy to Install kits available for almost any make or model truck trailer or bus.
Phone BElmont 4-8401
Truck and Industrial Equipment Co.
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RESIN BINDERS

Tailored for smooth production of superior particle board

● If you make particle board*, you know how important the amount and type of resin binder is to the properties of the board. With a given size and type of particle, variations in resin content will affect appearance, work properties, elasticity, rupture strength, shear strength and toughness.

Reichhold offers resin binders that are exactingly tailored to help you produce particle board with uniform properties. Whether you want a urea-formaldehyde resin binder or a phenol-formaldehyde resin binder, RCI can deliver a product which hardboard manufacturers in all parts of the country have found to give excellent results.

The uniform high quality and dependable performance of RCI resin binders and adhesives is safeguarded by continued quality-control—starting in many cases with the manufacture by RCI of its own key raw materials.

Look to Reichhold, too, for fast service. RCI plants in all major sections of the U.S. can supply any firm quickly by rail tank car or highway tank wagon. And Reichhold's field service offices are ready with expert counsel.

With advantages as important as these, it's evident why Reichhold successfully serves so many plywood, particle board and furniture manufacturers year after year. (In addition to urea-formaldehyde, phenol-formaldehyde and resorcinol resin adhesives, RCI supplies soybean and casein glues.)

*If you do not now make particle board, but contemplate starting this operation, RCI will send you free an excellent background bulletin, "Wood Particle Products . . . Processing Information and Economic Data." Write RCI and ask for *Bulletin G-9*.

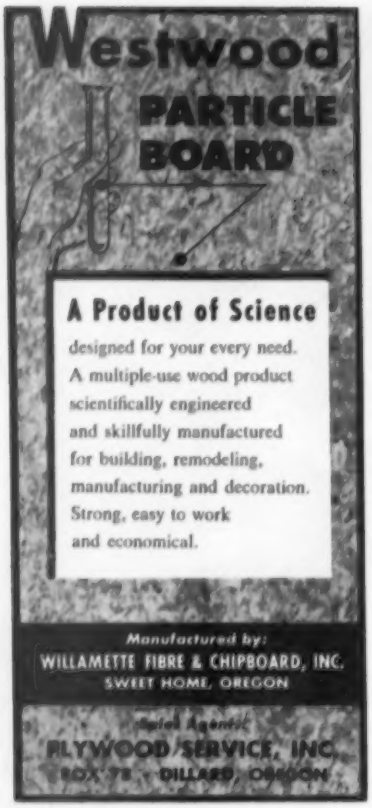
Creative Chemistry . . .
Your Partner in Progress

RCI

REICHHOLD

Synthetic Resins • Chemical Colors • Industrial Adhesives • Plasticizers
Phenol • Formaldehyde • Glycerine • Phthalic Anhydride • Maleic Anhydride
Sodium Sulfite • Pentaerythritol • Pentachlorophenol • Sulfuric Acid

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.



SPA Holds Sessions

(*Continued from page* 126)

scale of wages consistent with the economy of the industry, but to continue to oppose the principle of establishing and regulating wages and hours of work by the federal government.

Inspection Bureau Considers New Lumber Standards

SEVENTEENTH ANNUAL MEETING of subscribers to the Southern Pine Inspection Bureau, held April 9 in New Orleans, La., considered better membership communication and proposed new lumber standards. Chairman Brady Belcher, W. E. Belcher Lbr. Co., Inc., Centreville, Ala., presided.

Chairman Belcher outlined efforts being made to improve the relationship between the Bureau and its membership. He stressed the fact that faulty communication is the cause of most misunderstandings in organization work just as it is between employers and employees.

Mr. Brady described steps being taken to familiarize all subscribers with every phase of the work, including the appointment of a new five-man Advisory Board as an adjunct to the Board of Governors, and reviewed significant developments of 1956. He reported that new 1956 grading rules have become fully effective and have further enhanced Southern Pine's standing in the lumber trade. Some fifty thousand copies of the new rules have been distributed.

Mr. Belcher reviewed the various motions undertaken since the last annual meeting to have the minimum dressed dry thickness of boards, under the American Lumber Standards, changed from 25/32" to ¾". He related the problem that has arisen in the consideration of this proposal and the general feeling that has developed that ALS sizes should not be reduced unless it is definitely established that these sizes are minimum after seasoning to a specific moisture content.

A HEARING ON THE SUBJECT will be held in Washington, D. C., on May 16. Mr. Belcher announced that J. Kirby Herndon, Kirby Lumber Corp., Houston, Texas, who has represented Southern Pine on the American Lumber Standards Committee for the past seven years, has resigned and that Earl M. McGowin, W. T. Smith Lbr. Co., Chapman, Alabama, has been appointed in his place.

Mr. Belcher explained reasons for the recent ruling by the Comptroller General of the United States that it is entirely legal and appropriate for government contracts to require grademarking as a quality control measure.

Secretary-Manager A. S. Boisfontaine gave a detailed explanation of developments that led to the decision by the American Lumber Standards Committee to hold an open hearing on the proposal to have ALS sizes apply at specific moisture contents. He said that the pressure for action along this line has come from the Federal Housing Administration, and a number of federal lumber procurement agencies. He indicated that the American Lumber Standards Committee probably will not be able to take any action on the proposal to reduce the dressed thickness of 1" lumber from 25/32" to ¾" until this moisture content question has been satisfactorily settled.

New Officers
Southern Pine Inspection Bureau

CHAIRMAN: Brady Belcher, W. E. Belcher Lumber Co., Inc., Centreville, Ala.

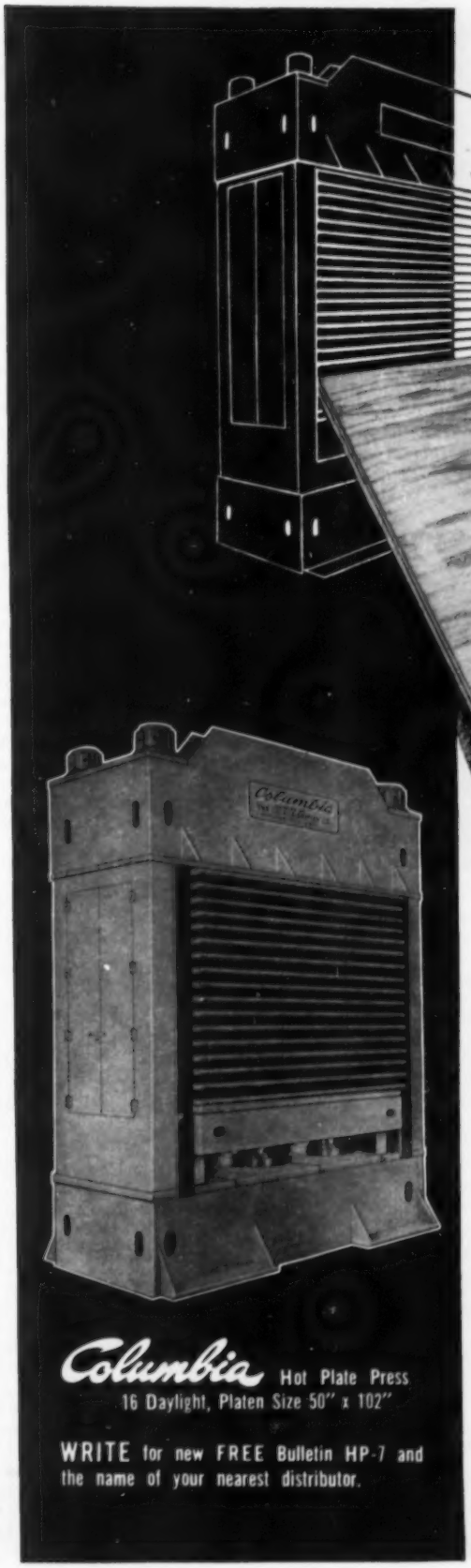
VICE-CHAIRMAN: R. B. Malcolm, Jr., Dierks Forests, Inc., Wright City, Oklahoma.

SECRETARY-MANAGER AND TREASURER: A. S. Boisfontaine, New Orleans, La.

GENERAL COUNSEL: Charles E. Dunbar, Jr., New Orleans, La.

BOARD OF GOVERNORS: ALABAMA—*Brady Belcher, W. E. Belcher Lumber Co., Inc., Centreville;* ARKANSAS—*E. C. Gates, Fordyce Lumber Co., Fordyce;* FLORIDA—*W. F. Walker, Dantzler Lumber and Export Co., Jacksonville;* GEORGIA—*G. B. Saunders, Alexander Brothers Lumber Co., Columbus;* LOUISIANA—*E. C. Johnson, J. A. Bentley Lumber Co., Zimmerman;* MISSISSIPPI—*Tom DeWeese, A. DeWeese Lumber Co., Inc., Philadelphia;* NORTH CAROLINA—*J. K. Barrow, Jr., Barrow Mfg. Co., Ahoskie;* OKLAHOMA—*R. B. Malcolm, Jr., Dierks Forests, Inc., Wright City;* SOUTH CAROLINA—*M. C. Colvin, Holly Hill Lumber Co., Holly Hill;* TEXAS—*J. K. Herndon, Kirby Lumber Corp., Houston.*

Rader Solves CONVEYOR PROBLEMS
RADER
PNEUMATIC CONVEYORS
PIPELINE GOES OVER YARD, UNDER POND AND ROAD TO RAIL CARS
OR ANY DESTINATION, CARRYING CHIPS, BARK, SAWDUST OR SHAVINGS.
Vancouver, B.C. 4645 Main St.
Eureka, Calif. Box 61
Boston, Mass. No. 10 High St.
Memphis, Tenn. Box 3722 Mun. Airport
Rader Pneumatics, Inc. 1739 N. E. 42nd Street Portland 13, Oregon ATlantic 2-7767



HERE'S A "SQUEEZE PLAY"...

that produces profits!

In the production of plywood, veneer, hardboard or other laminated products, there's no room for a "squeeze play" that might fail.

Leading manufacturers find Columbia Hot Plate Presses an all-star contender for applying the "squeeze play" that produces profits. Its rigid design, trouble-free hydraulic system and honest ratings assure dependable performance on any hot plate job.

There are almost a score of Columbia features that guarantee more production, of higher quality and fast, too! Complete details are available in new literature or from your Columbia Hydraulic Press distributor.

Columbia Hot Plate Press
16 Daylight, Platen Size 50" x 102"

WRITE for new **FREE** Bulletin HP-7 and the name of your nearest distributor.

THE **Lodge & Shipley** COMPANY

NEW OFFICERS of Timber Products Manufacturers Assn. which held its annual session at Hayden Lake, Idaho, on April 24 and 25. From left: secretary, George J. Tichy, Spokane, Wash.; treasurer, J. L. McCarthy, White Pine Lumber Co., Orofino, Idaho; past pres., L. R. Pugh, The St. Maries Lumber Co., St. Maries, Idaho; pres., J. Harold Sampson, White Pine Sash Co., Spokane, Wash.; v.-pres. Fred Broeder, Jr., Broeder Bros. Lbr. Co., Creston, Mont.

All Steel Buildings

for the Lumber Industry?

THIRD LOCATION. These Armco Steel Buildings are now at their third site. Each time they were completely dismantled and re-erected. First time they were moved 90 miles; second time 140 miles.

Why not, if Armco Steel Buildings can offer you the advantages you want:

1. QUICK ERECTION
2. EASY PORTABILITY, OR
3. COMPLETE SALVAGE FOR REUSE
4. MINIMUM MAINTENANCE
5. FIRE RESISTANCE

Through these advantages, factory-made Armco Steel Buildings also prove their economy. They are easily and quickly erected, weather-proof and noncombustible. Dismantling is simple, and the completely salvaged building may be quickly erected at a new site. There is practically no maintenance.

Armco Steel Buildings are available in more than 5,000 sizes to meet your specific needs—from tool sheds to a complete lumber mill. Prompt shipment.

Write us for complete data or call Western Union and ask for Operator 25.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
CALCO AND NORTH PACIFIC DIVISIONS
Berkeley • Los Angeles
Portland • Seattle • Spokane

Armco Steel Buildings

Manufacturers Meet

MORE THAN 150 members of the Timber Products Manufacturers Association attended the two-day 1957 convention April 24 and 25 at Hayden Lake, Idaho.

Walter Leuthold, President, Deer Park Lumber Company, Deer Park, Wash., president, National Lumber Manufacturers Association, spoke on "Lumber in the International Scene," and announced that a nationwide lumber marketing committee will hold its first meeting in Boston, Mass., on May 13. Mr. Leuthold remarked "this committee has a great opportunity to come up with some suggestions to put real vitality into lumber promotion in competition with many materials whose producers are extremely active in advertising and trade promotion."

New "Old Timers" who received special recognition included: J. Herbert Bate, J . Herbert Bate Lumber Co., New York City, New York, 58 years; U. R. "Ray" Armstrong, Hallack & Howard Lumber Co., Denver, Colorado, 52 years; W. F. "Bill" Stewart, ack River Tree Farm Products, Spokane, Wash., 48 years; Sam Gilbertson, Potlach Forests, Inc., Rutledge Unit, Coeur d'Alene, Idaho, 44 years; Robert Doolittle, Priest River Lumber Co., Priest River, Idaho, 43 years; Elmer E. Belknap, Potlach Forests, Inc., Coeur d'Alene, Idaho, 40 years; J. W. "Bill" Campbell, Potlatch Forests, Inc., Rutledge Unit, Coeur d'Alene, Idaho, 40 years; Paulmer Soderberg, Ahsahka Lumber & Milling Co., White Pine Lumber Co., Orofino, Idaho, 40 years.

Engineers Plan Session

• A special program on problems of the wood and lumber industry, with particular attention to the Northwest States, will be included in the semi-annual meeting of The American Society of Mechanical Engineers to be held at San Francisco, Calif., June 9-13. An all-day session will deal with converting sawdust and wood chips into useful products, remote control systems for sawmill carriages, and modern techniques of scientific forest management and conservation.

Milton H. Mater and John Matuszak, Mater Machine Works, Inc., Corvallis, Ore., will speak on "Taper Sawing to Improve Quality in the Sawmill Product." "Conversion Factors in the Lumber Industry" will be discussed by S. M. Batori, Controls and Communications, Inc., Eugene, Ore. "Remote Control Systems for Setting Sawmill Carriages" will be presented by Lee Gensman, Monarch Forge and Machine Works, Portland, Ore.

Chairman of the panel is William H. Rambo, industrial plant engineer, Portland, Ore.

A panel discussion will be moderated by Conant Dodge, Weyerhaeuser Timber Co., Tacoma, Wash., on the topic, "Wood Utilization Trends in the Northwest."

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Ledeen CYLINDERS operate bridging sections of lumber separator

Illustration shows lumber separator and grading table in Oregon sawmill. Bridging sections on the separators are actuated by 4"Ledeen Air-Operated Heavy Duty Cylinders, shown suspended from cross beam at far end of separator.

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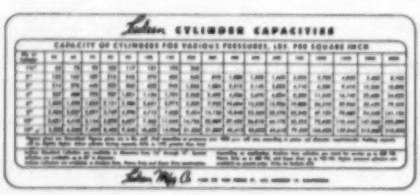

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VALVES • CYLINDERS
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Research Needs to Enhance Insulation Board's Future

By
FERGUS A. IRVINE and
A. WATSON CHAPMAN

The Celotex Corp., Chicago, Ill.

SOME OF THE RESEARCH WORK in the field of insulation boards will be aimed at improvements in processes already being carried out. Research activities will be aimed at reduction in costs of insulation board in all of its forms, through design of new machinery to carry out manufacturing processes to as large an exent as possible by automatic mechanical means.

Methods of processing new fibers with new methods of chemical preparation, new refining equipment, and even new types of board forming and drying equipment are constant under investigation and will receive further emphasis.

Research activities are needed along the line of trying to obtain better strength at lower weights and densities. Some of the work in this field involves fundamental studies of fiber characteristics, relationship of fiber diameters and lengths in various admixtures, and distribution of air spaces together with the ratio of air space to solid fiber.

Further increasing dimensional stability of board to varying exposures of humidity and temperature, increasing its water-proofness, protecting the cellulosic materials from attack by termites, improving its resistance to mold and fungi attack, increasing the washability and hardness and durability of exposed surfaces, and improving its resistance to flame and fire.

Research is needed in techniques used for determining fiberboard properties, particularly in current methods for measuring thermal conductivity and vapor transmission. Present standard methods are cumbersome and agreement between different laboratories using these same methods is often difficult to obtain.

New Plant Scheduled

Pope & Talbot, Inc., will soon be producing particle board in a new plant at Oakridge, Oregon.

Virgin timber Douglas fir wood particles and flakes will be combined with modern synthetic resins to form a quality particle board, available with or without flake content. Engineered panels for specific end uses will be produced. Both industrial and building trades markets will be met.

The new plant is designed for an annual production of 11 million square feet of ¾" board. The basic size is 48" x 96"; however, cut-to-size and edge gluing facilities permit producing any sizes desired. Range in thickness is ⅜" to one inch.

Chemicals Aid Board

(*Continued from page* 47)

tums. These two products are also highly effective in small percentages, with only ¾ % to two per cent being required to provide the necessary moisture resistance.

Emulsions are generally somewhat more effective than petrolatum, on a weight basis, but this difference is offset by a decided cost advantage for the petrolatum, which is now used in most hardboard processes, and in many particle board plants. In hardboard, the molten material is metered onto the chips at the time of grinding, which gives excellent dispersion on the fiber and also assists in the grinding. In particle board, it is sprayed onto the particles, usually in the same mixer in which the resin is added. If wax emulsion is used, it is added to a fiber slurry, sprayed directly onto the fibers or particles, or mixed with the resin prior to spraying.

ALUM IS USED in wet process boards to assist in precipitating the binding resin onto the fibers, and improve the efficiency of the wax sizing. Since only a small amount of alum may be used before the board strength is adversely affected, sulfuric acid is used to complete the resin precipitation. Some alum is also used in sizing hardboard containing hardwood fibers, but the total amount of both alum and acid is not large.

In addition to the resins and sizing chemicals, an appreciable amount of drying oils, such as soy and linseed oil, finds use in tempering hardboard for improved properties, with phenolic resin being evaluated and expected to find some application for this purpose. The present process requires a multiple step operation of pressing the boards, dipping them into an impregnating batch to pick up about five per cent oil, and subsequently baking or repressing them. It is hoped that the whole process can be accomplished in the original pressing operation by the use of resin.

Major functions of binding, sizing, and tempering account for nearly all of the chemicals used in the composition board industry, with only minor amounts being used for a variety of miscellaneous uses. However, with the research efforts being expended in this field, new chemicals to enhance the properties of board products are certain to find substantial use. Chemicals to provide better durability, fire, mold, and insect resistance, better paint-ability, and better surface properties are now under investigation, and some of these can be expected to be incorporated into board products shortly to make the already large contribution of the chemical industry to the composition board industry even greater.

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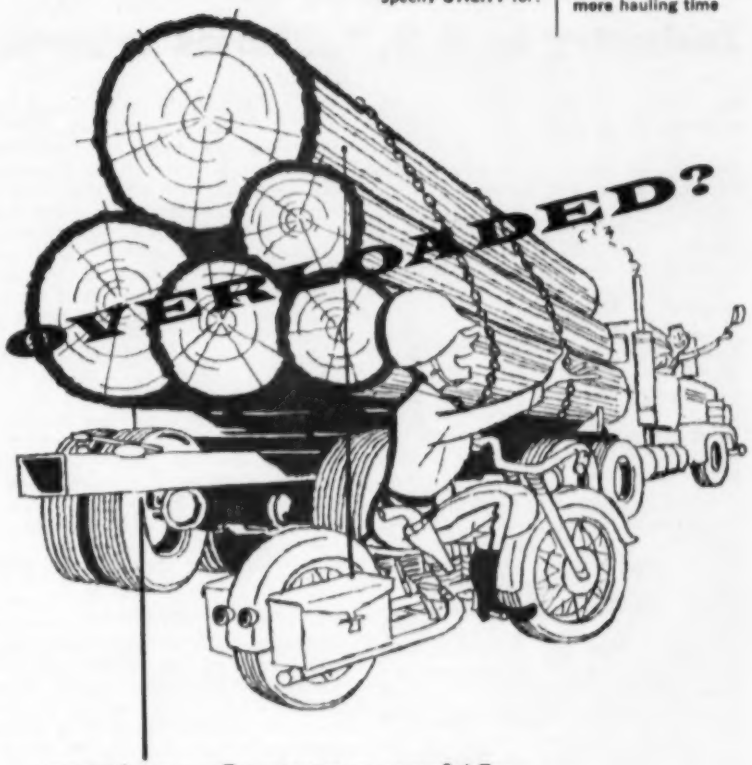

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Insulation and Hardboard Industry in U.S.A. Shows Growth

By
WAYNE C. LEWIS

Engineer, Forest Products Laboratory, Forest Service, U. S. Dept. of Agriculture

THE INSULATION BOARD industry was started in the United States in 1914 by Minnesota and Ontario Paper Co., with a plant at International Falls, Minn. Celotex Corp. and Wood Conversion Co. soon followed with respective plants at Marrero, Miss., and Cloquet, Minn. The industry has grown steadily since then, and 17 companies now operate a total of 20 plants producing three billion square feet of board per year (½ inch basis).

While only one new plant for manufacturing insulation board, Oregon Fiber Products Co., Pilot Rock, Ore., was established between 1948 and 1954, six of the 17 companies completed or announced increased capacity during the past two years. When announced plans are completed, productive capacity will be increased an estimated 50 per cent.

Although wood is the major raw material for insulation boards in the United States, there are exceptions. The Celotex Corp. uses a blend of bagasse (sugar cane) fibre and reprocessed waste paper. Pioneer Flintkote uses all bagasse. The Homasote Co. uses repulped newsprint with 15 per cent of commercial sulfite pulp to improve the stock. The Dubuque plant of the Barrett Division uses some flax shives, while MacAndrews and Forbes uses quantities of the licorice root remaining after extraction of licorice.

Most of the insulation board manufacturers use the groundwood process for pulping wood. Actual grinding is preceded in one instance by a hot caustic soaking of 24 to 48 hours to soften the fibre. When the groundwood process of mechanical pulping is used, wood is in the form of billets. Other companies use the Asplund system of defibrating or some other system of steam or semi-chemical cooking followed by disc refining.

IN THESE INSTANCES, wood is chipped in a conventional pulp chipper before pulping. Companies that use residue material from another operation must employ a chip process, since the wood is not usually in a form that can be put through the grinder. Fir-Tex Insulation Board Co. and the Simpson Logging Co. use residues for part of their raw material.

American companies use both cylinder formation and modified Fourdrinier formers. There are advantages to each type, but neither system is preferred over the other. Both types of formers are being installed in new plants or additions to present plants. The driers are all multideck, continuous tunnel type. Although most are roller actuated a few are of the moving-foot type. The driers are steam, oil, or gas fired.

Major uses for insulation board are all geared to the building construction industry. Over 50 per cent of production is in two types of board, sheathing and interior.

Of relatively new products that hold high market potential, shingle backer and insulating roof deck are the most promising.

Several attractive new designs for acoustical surfaces have been well accepted in the trade. New uses are being studied and reported.

Hardboard Industry

The hardboard industry started after the softboard industry. William Mason, developer of the Masonite process, received his first patent for hardboard in 1928. The initial plant was constructed at Laurel, Miss. In 1934, the U. S. Gypsum Co. at Greenville, Miss., started to produce hardboard by pressing previously dried insulation board. From then until 1948, no additional plants were built, although the Masonite Corp. expanded several times during that period.

In 1948, the first small plant for manufacturing hardboard was constructed by the Chapman Manufacturing Co. at Corvallis, Ore. Since that time, numerous other smaller plants have been constructed. Many of these are in the Pacific Northwest where they can utilize as raw material the residues of another forest product manufacture. At present 13 companies are manufacturing hardboard in 15 plants, and at least another five plants are under construction. Current production is at the rate of about 1¾ billion square feet per year (⅛ inch basis).

THE HARDBOARD INDUSTRY has continued to increase its production capacity. Even with the heavy increase between 1948 and 1954, construction since then will increase capacity an estimated 40 per cent.

Hardboard is manufactured exclusively from wood in the United States. Originally all processes were wet; that is, the fibre was pulped, refined, conveyed, and formed from a pulp slurry. Board so made is said to be wet-felted. If the formed mat of fibre is hot-pressed and dried in the hot press, a screen must be used on one surface of the mat to allow steam to escape while hot-pressing. The resultant hardboard has the reverse impression of the screen on one surface of the board and is known as a screen-back board. If the mat is dried before pressing, the screen is not necessary, and a board is classed as S-2-S (smooth two side).

Many of the new plants built during the past eight years, particularly on the West Coast, are designed to utilize as raw material residue of other forest products manufacture. Because of the concentration of sawmill and plywood operations on the West Coast, many of the new hardboard plants have been located in that area.

ALL HARDBOARD MANUFACTURERS use modified Fourdrinier formers with the wet-felting. Some employ heavy washing after refining, but others use limited washing or none at all. All plants using wet-felting procedures, except the Masonite Corp., add small amounts of phenolic resin to improve the bond and water resistance. The Masonite process requires resin only for certain specialty items. Air-felting plants use varying amounts of resin depending on the moisture content at pressing, the quality of fibre, and the efficiency of felting.

As is the case with insulation board, nearly all United States production of hardboard is consumed in that country. Exports are negligible, and imports are likewise small in quantity. In a few instances, irregular imports have tended to disrupt markets in America. Prior to 1948, the Masonite Corp. and U. S. Gypsum Co. were the only American producers of hardboard, although from the start of the industry in 1924, the production and consumption had increased steadily.

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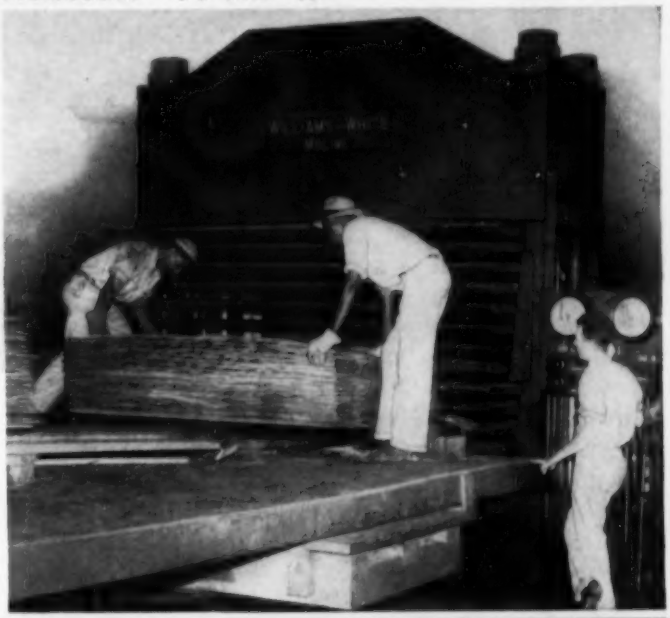

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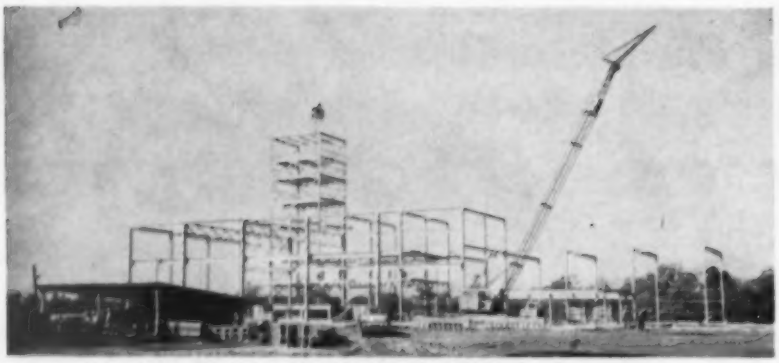

UNDER CONSTRUCTION at Dibbol, Texas is new fiberboard plant of Southern Pine Lumber Co., Dibbol, Texas. New Product, called Templebord, will be manufactured in $4 million plant.

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Insulation Board Plant Scheduled for Texas

• Southern Pine Lumber Co. has under construction an insulating board plant at Dibbol, Texas, scheduled for start-up January 1, 1958. It will manufacture Templebord, with capacity slated for 100 million square feet annually of half-inch board.

The Templebord process is a flexible one which permits use of varying degrees of treatment from groundwood to semi-chemical on pine and/or hardwoods to produce insulating boards with an extremely wide range of physical characteristics. Products to be made will include roof insulation and insulating sheathing. The products will be highly water resistant.

Major equipment includes a Bauer rapid cycle digester, a Dorr-Oliver washer, Bauer No. 411 refiner, Clark and Vicario deculator, Black-Clawson fourdrinier and Coe 8-deck, 3-zone direct gas fired dryer.

Company personnel include: W. Temple Webber, chairman of the board; Arthur Temple, Jr., president; Latane Temple, vice-president; D. L. Gleaves, manager; Carrol Allen, assistant manager and chief engineer.

Weyerhaeuser Wins Award

• A top place for a public-interest advertising campaign produced and published in 1956 has been won by Weyerhaeuser Timber Co., Tacoma, Wash. Its number one full color advertisement, featuring tree marking in a ponderosa pine stand, received special citation as the "most distinguished public interest advertisement of the year."

The award was made in *The Saturday Review's* Fifth Annual Advertising Awards. Other firms winning awards for public interest advertising include: American Cyanamid Co., Caterpillar Tractor Co., Container Corporation of America, General Electric Co., General Motors Corp., and Westinghouse Electric Co.

LEADERS OF Interior Lumber Manufacturers Association of British Columbia, elected at a recent annual meeting in Penticton, are from left: E. L. Vance, vice president, and G. W. Eriksson, Knight Lumber Co., Crowsnest, B. C.

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Band Saws

Spear & Jackson Bandsaws can be counted on to perform with the best. Into them go the finest steel obtainable and a quality of workmanship in welding, swaging, grinding, and tensioning, gained from years of sawmaking experience.

Spear & Jackson Bandsaws are custom-made to your exact specifications at our factory in Eugene, Oregon. Large and small operators alike are satisfied users.

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DIAMOND CALK Horseshoe Co.

DULUTH, MINN. Est. 1908 TORONTO, ONT.

New Techniques in Veneer

(*Continued from page 68*)

power again. At that time the conveyor will automatically resume its feeding of the chipper.

USE OF MULTIPLE SPUR KNIVES to take care of trim on the Coe 10-foot lathe has resulted in an estimated $30 additional chip income during each shift of operation. The Simonds knives are mounted on 9/16-inch centers so as to cut the trim into proper chip size. Strips break into chips while being blown to chip loader

Chief engineer E. L. Ensley built and installed the knife-holders on both sides of the lathe at an approximate cost of $200 for each installation. Holders are available for 15 knives, but six are in use at present. Should longer blocks be used, more knives could be installed.

How Tipple Operator Is Eliminated

Working with Drain Machinery and Supply Co., Drain, Oregon, Republic Electric and Development Co engineers developed (1) a good, simple system of synchronization, (2) simplified the tipple hoist operation to a one action job and (3) perfected a method of breaking the veneer sheets automatically.

First step, was development of the "Redco" control whereby the speed of the tray system is automatically synchronized with the sheet speed of the veneer leaving the lathe, usually a tipple operator function.

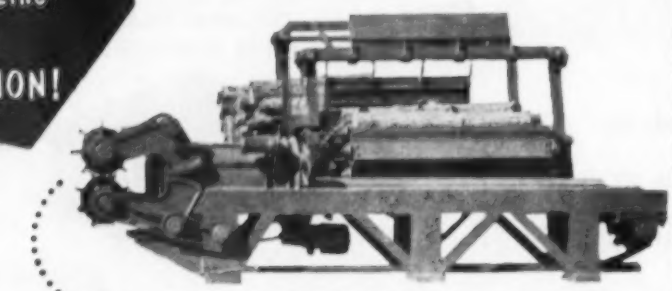
Second function that the tipple operator usually handles is the starting of the new tray, stopping the old tray and positioning the tipple hoist at the proper place to feed veneer into the new tray. "Redco" developed a control system which enables the operator to pre-select the next tray to be used; he simply presses an "action" button when he wants all these three operations to take place.

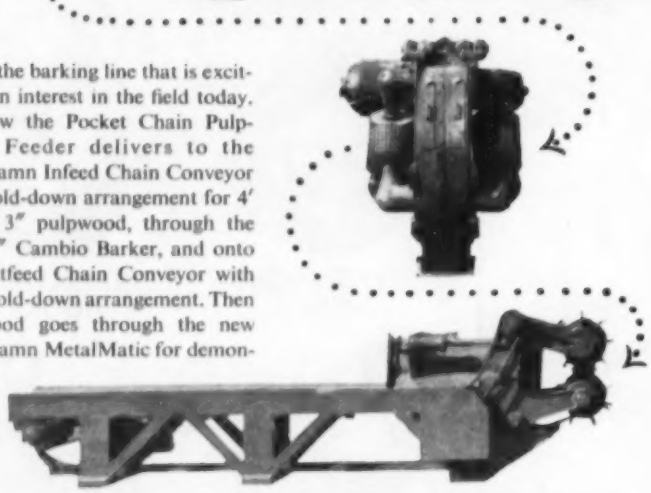
Third function of the tipple operator is to tear or break the veneer, allowing the tipple to move to the next tray. This action is now done automatically by the "Air-Jet" veneer breaker manufactured by Drain Machinery and Supply Co., Drain, Oregon. Controls on this are provided by "Redco."

Heart of the "Redco" electric installation is the 125/150 hp lathe drive which not only supplies power for the turning of the log, but also supplies the variable voltage power to the tipple motor and the tray motor.

See this Soderhamn Line IN ACTION!

New film available for showing in your own plant...





Here's the barking line that is exciting keen interest in the field today. See how the Pocket Chain Pulpwood Feeder delivers to the Soderhamn Infeed Chain Conveyor with hold-down arrangement for 4′ and 5′ 3″ pulpwood, through the fast 21″ Cambio Barker, and onto the Outfeed Chain Conveyor with same hold-down arrangement. Then pulpwood goes through the new Soderhamn MetalMatic for demonstration of its sensitive metal detecting, dye-marking and warning signal operation.

Ask for this demonstration film for showing in your own office. Can be shown on any 16 mm. projector.

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Roddiscraft Timboard Plant

(*Continued from page 59*)

hour at 225 psi with fuel obtained from refuse from Roddiscraft's adjoining plywood plant. Worthington and Gardner-Denver air compressors supply the compressed air for the operation.

Engineering & Construction

General engineering was handled by the Donald Seip Company of New York City with detailed engineering done by Ford, Bacon and Davis, New York City. All millwrights and machinery erection crews were hired from the Arcata-Eureka union halls with an 11-man German supervisory team at the plant during construction. These men were sent from Germany to organize the assembling of the specialized machinery as they have done in other world-wide installations. Engineer Max Himmelheber coordinated the German consultants.

The three-story plant is on the former location of a Roddiscraft log pond with the foundations on 1,000 piling, some as long as 65 feet. Corrugated asbestos siding was used with steel framing and a ¾-in A-B plywood built-up roof was installed. The main floor has 52,000 square feet with 17,000 square feet of warehouse floor space available. Main production lines are all fluorescent-lighted with incandescent lights and plastic skylights furnishing other illumination.

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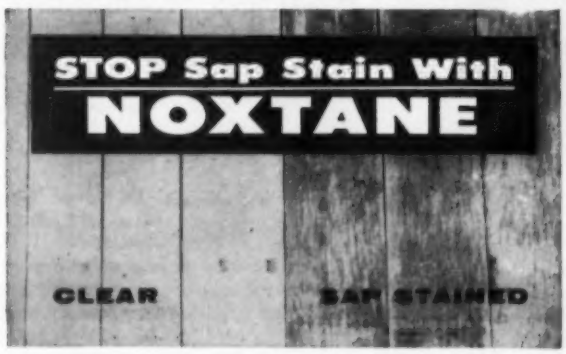

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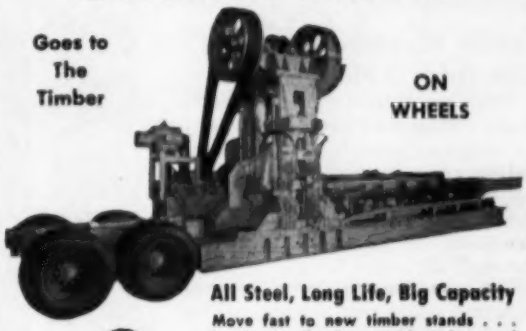
SEMI-PORTABLE GANG SAW

Goes to The Timber



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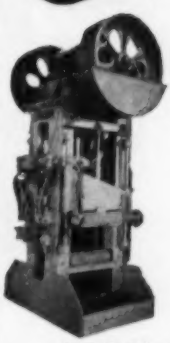
All Steel, Long Life, Big Capacity

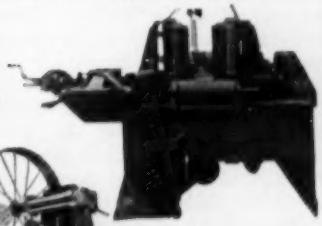
Move fast to new timber stands . . . level up trailer frame with timbers and start cutting . . . no special foundation needed. Big Mills: Keep small logs out of your big mills . . . save trucking costs with a Gunderson Semi-Portable Gang Saw!



. . . as a Stationary
GANG SAW

- Accurate; rugged; saws logs or cants. Cuts 8' logs without extra attachment.
- Variable hydraulic feed works . . . speed 0' to 30' per minute.
- Special attachment available for cutting 2 logs at one time.

Cost-Cutting Lumber Salvaging
CIRCULAR RESAW



Recovers profitable board feet from every log. Gauge and Bevel Sawing, center splitting. Up to 250 lineal feet per min. Use as an Edger.

Complete Sawmill Planning and Engineering Service

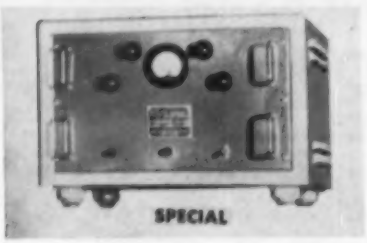
Vertical BAND RESAW

- Accurate Gauge & Bevel sawing . . . Center splitting.
- Instant Setting.
- All-steel Pressure Bar Feed Table and Feed Rolls, or
- with Tilt Table & Quadrant Set Works.

All Equipment Available on a Lease-Rental Basis

Write for Illustrated Literature and Complete Information.

GUNDERSON BROS. ENGINEERING CORPORATION
Steel Fabricating Division
4700 N. W. Front Avenue
Portland 8, Oregon



SPECIAL

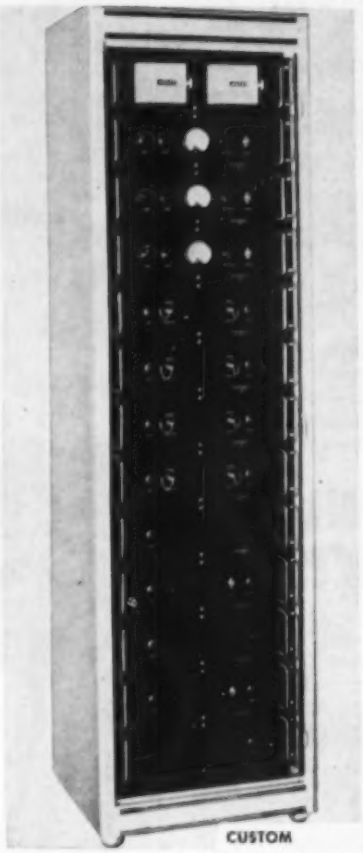
Laucks Moisture Detector Line Adds 3 New Models

• Three new versions of the Laucks Sentry continuous moisture detector—an electronic system for measuring and/or recording the moisture content of moving veneer, lumber, paper and other forest products—have been announced by Laucks Laboratories, Seattle, Wash.

The new "Custom" model presents a unitized system with primary circuits contained in light-weight, replaceable type drawers, automatic power regulation and selectivity curves ranging from zero to fibre saturation. It is primarily for large installations and certain overseas areas with limited service facilities. Through the "plug-in" feature, a replacement drawer can be air shipped to any producing area within two to three days.

A second new model, the "Special," is designed for smaller domestic industries requiring less critical control. Although scaled down in both size and application, the "Special" provides 100% inspection and marks over-wet stock at any desired level.

A third system, known as a "Monitor," employs a console unit identical to the "Custom" model. It features a single electrode mounted directly on one deck of the veneer dryer. Scanning a representative sample of production and relaying signals to a continuous recorder, the "Monitor" provides the dryer tender with a permanent record of performance, points

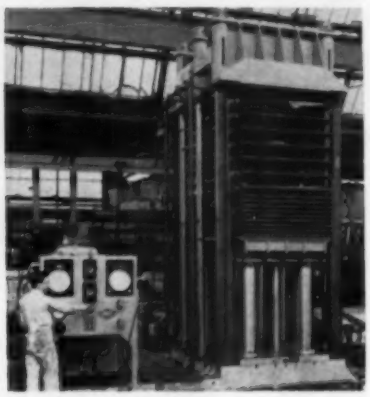


CUSTOM

out errors in drying speed, loading and pre-sorting.

Laucks officials state that the majority of their earlier systems will be superseded by the new design. First customers for the new systems include United States Plywood Corp. (Lumber Division) at Anderson, Calif.; Hollow Tree Lumber Co., Ukiah, Calif.; and Santa Clara Lumber Co., Manila, Philippines.

For complete information write Laucks Laboratories, Inc., 1201 Poplar Pl., Seattle 44, Wash.



Testing a Giant

UNDERGOING FINAL ASSEMBLY and testing in the Seattle plant of Washington Iron Works is this large 16-opening hydraulic hot-plate press. The Washington press, along with automatic press loader and unloader (including injecting and ejecting equipment), is now being installed in the new particle board plant of Pope & Talbot Inc. at Oakridge, Ore. The recently completed plant is scheduled to begin production currently.

John Tyner Joins Prentice, Heads New Utilization Dept.

John Tyner

• The rapidly expanding field of utilization of residues through particle board manufacture has prompted the E. V. Prentice Co., Portland, Ore., manufacturers and distributors of veneer and plywood plant equipment, to establish their new Utilization Department. Heading the department will be John Tyner, former president and general manager of the Willamette Fiber and Chipboard Corp., Sweet Home, Ore., and current treasurer of the National Particle Board Association.

Grenco Now Offering Complete Board Service

• Grenco, Inc., Portland, Ore., is currently organized to design, engineer and install complete hardboard plants and to guarantee production of a stipulated quality board at a predetermined cost of production.

Grenco has been active in the dry and semi-dry process equipment manufacture since the very start of these new processes. Grenco designed and sold some of the first equipment that was based on original laboratory findings. Seven of the eight plants in the world using the Plywood Research Foundation process ("semi-dry") have Grenco equipment.

This firm's equipment includes the Grenco rotary feed valve, continuous digester and resin blender. The digester and valve patents are currently assigned to Bauer Bros., Springfield, O., for U. S. sales. Foreign rights are retained by Grenco.

Although primarily interested in the dry or semi-dry process hardboard manufacture at the present time, Grenco has done extensive work in particle board, flakeboard and other boards.

Some of the plants using Grenco equipment include: Masonite of Australia; Anacortes Veneer; Cascades Plywood Corp.; Georgia-Pacific Corp., Coos Bay, Ore.; ELKA (Istanbul, Turkey); N. Z. Forest Products Ltd.; Nu-Ply Corp., Bemidji, Minn.; U. S. Plywood Corp.; and Longview Fibre Co.

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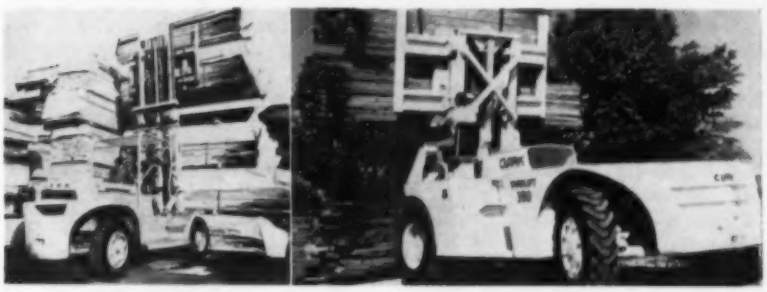
New Products & Services



Two New High-Capacity Models Added to Clarklift Line

CLARK'S NEW CFY-180 (above, left) has 18,000 lbs. capacity and features dual drive wheels, power steering and power brakes. The steer axle is pivoted on rubber mountings to absorb shock and give constant ground contact on uneven terrain. This CFY-180 was incorrectly labeled the Clarklift Y-350 on page 124 of the April 19 issue of THE LUMBERMAN. For the real Model Y-350, see the picture at above right. This huge lift has a 35,000-lb. capacity. The operator sits above the left front fender for a clear view of the load. It was designed for heavy lifting at lumber yards. Power is provided by a 404-cu. in. Hercules gas engine. The CFY-180 has a "smaller brother," the CF-165, with a capacity of 16,500 lbs. Both are powered by a Hercules 6-cyl. gas engine of 282 cu. in. displacement. For further information of the CFY-180, CFY-165 or the Y-350, write Industrial Truck Division, Clark Equip. Co., Battle Creek, Mich.

Automatic Lubrication Aid To Sawmill Maintenance

• An automatic lubrication system, requiring only the quick occasional filling of one reservoir pot, is now available on Mater sawmill carriages, manufactured by Mater Machine Works, Corvallis, Ore.

The automatic system lubricates the carriage knee slides and all friction and anti-friction bearings except the wheels, which are factory packed at the Mater plant and require lubrication each six months. The system also lubricates the knee drive chain and any other chains on the carriage and also the V rail.

The lubrication is completely automatic. The lubricator is tied into the setworks and every time the setworks retracts the knees, a shot of oil is poured into each bearing.

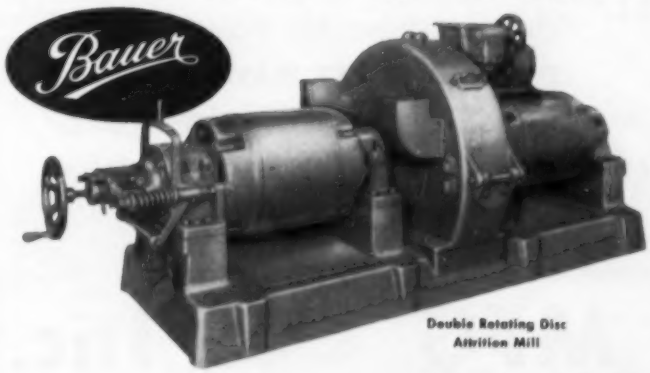
New Esco Grapples Are Heavier; Cost Is Less

• Two new log grapples have been added to the Esco line. Thoroughly field tested and approved, the No. 2A grapple and the No. 4 grapple provide ease of operation and larger loads at reduced prices. Features are rugged construction, larger sheaves, heavy duty roller bearings and larger capacity.

The No. 2A is similar in design to the Standard No. 2 but much sturdier in construction. Grooved for ⅞" or 1" line, the large capacity sheaves run on heavy duty roller bearings lubricated through alemite grease fittings. With stronger box section arm construction, 2A handles logs up to 55" in diameter.

The No. 4 is constructed of high strength T-1 plate, eliminating extra weight. Able to handle logs to 7' in diameter, the No. 4 grapple "cradle holds" the logs without a piercing tong action. It has a maximum spread of 120" and will close to 18".

Attrition Mills for high density, fine-grained particle board...



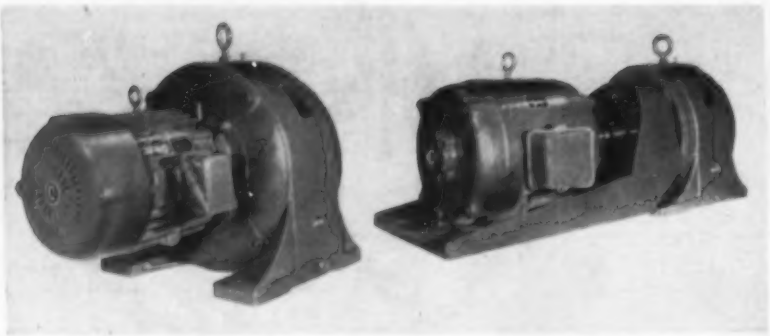
Double Rotating Disc
Attrition Mill

If you want to make smooth, clean appearing particle board with high strength, uniform fine-grain texture, resistance to moisture and wear, Bauer Attrition Mills fit into your production picture.

For preliminary size reduction of shavings, chips, edgings, and other raw material scrap, many plants rely on Bauer *Hammer* Mills for board or fuel.

May we send you complete information on Bauer equipment designed to improve your production?

THE BAUER BROS. CO.
1827 Sheridan Ave., Springfield, Ohio



Century Introduces New, Improved Gearmotor Line

• Century Electric Co., St. Louis, has completely redesigned its line of gearmotors to assure customers top efficiency in all slow-speed power applications.

Single, double and triple reduction is available with output speeds from 750 to 7.5 rpm with units of the type at left. Ideal where quick motor interchangeability is necessary are units of this class, shown at right. Double and triple reduction units have output speeds from 350 to 7.5 rpm.

"These new, improved gearmotors," Century reports, "combine highest motor quality and precision gearing to provide increased dependability, cooler operation, maximum wear life, and trouble-free service, even under the heaviest loads."

Designed to meet the user's specific needs, the new gearmotors are available with polyphase, single phase and DC motors, with a variety of mounting positions possible, including downshaft and tilted shaft. Also, they can be obtained in open drip proof, dust proof, explosion proof, and totally enclosed frames.

Complete details may be obtained from Century Electric Co., 1806 Pine St., St. Louis 3, Mo.

Chevrolet Offers 12 Models In New Line of 4x4 Trucks

• Chevrolet now producing 12 models of 4-wheel drive trucks: the Suburban Carryall; the ½, ¾ and 1-T. pickup; 1-T. panel; and ¾ and 1-T. stake truck models.

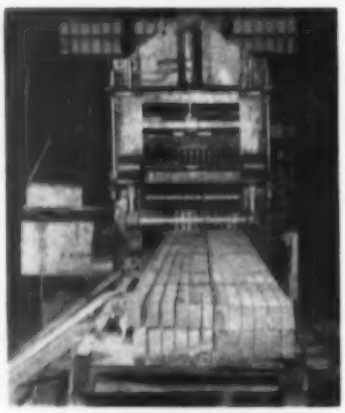
The versatile 4" x 4's" are designed to meet specific needs of off-road operators where steep grades, deep mud and sand, and other conditions of terrain make operation of normal 2-wheel drive vehicles difficult or impossible.

Ease of operation is one of the outstanding features of the new vehicles. The power is supplied through a four-speed transmission, then "split" between the front and rear wheels through a two-speed transfer case. Front wheel drive may be engaged or disengaged at any time without using the clutch, provided the transfer case is shifted into direct drive.

For maximum power applications, however, the transfer case may be shifted into "underdrive" and 4-wheel operation is put into effect automatically.

The front driving axle is a Chevrolet assembly similar to the rear axle. Smooth, continuous power is supplied through the front wheels regardless of turning angle.

CUT PRECISION LUMBER
with the "SEATTLE GANG" Improved



Newest Conception in Sawmilling

SEEING IS BELIEVING — LET US PROVE IT

Fast delivery on 12x32; 8x32 & 18" round

LOWEST CONNECTED POWER
LOWEST SAWDUST WASTE
LOWEST FINISH ALLOWANCE

MORE PROFIT — — — MORE OVER-RUN

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Oregon Representative — CALDWELL MACHINERY CO., 738 N.W. Glisan, Portland 4, Oregon

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General Machine & Engine Works

Phone RAinier 0544 Seattle 8, Wash.

News of Suppliers

- **Promotions**
- **Appointments**
- **Plant Expansions**
- **Mergers & Acquisitions**

• Newly appointed dealers for Clark Equipment Co. construction machinery division who will sell and service the Michigan line of tractor shovels and excavator cranes include: ***Graid Equipment Co.,*** Reno, Nevada, covering adjoining areas of California plus all of Nevada; and ***Cramer Machinery Co.,*** Portland, Ore., covering most of Oregon plus southwest Washington counties.

• Merger of ***Joseph Dixon Crucible Co.*** and ***American Crayon Co.*** has been completed. American Crayon is now a division of the Dixon company. The firm's products include lubricants, protective paints and wax crayons.

• ***Gerald D. Greggs,*** formerly advertising manager for Pacific Car & Foundry Co., Renton, Wash., has joined Electric Steel Foundry Co., Portland, Ore., as product divisions account manager. He will work with the manufacturing divisions in their pre-selling activities.

• ***Wood Tractor Co.,*** Portland, Ore., has opened a modern new headquarters building at N. E. 82nd Ave. and Killingsworth. An open house was held for friends and customers on April 27. ***George Carr*** is president of Wood Tractor Co.

• Major lumber-producing areas in U. S. have newly assigned dealer service representatives for Clark construction machinery division, as follows: ***Joe Harrison*** at Arlington, Tex.; ***Cecil Starner*** at San Mateo, Calif.; ***Harold H. Cadell,*** Beaverton, Ore.; and ***Charles R. Lewis,*** Birmingham, Ala.

New Nopak-Matic Valve Line Introduced to Salesmen

THE FIRST REGIONAL meeting for western states and British Columbia sales representatives of the Nopak Division, Galland-Henning Mfg. Co., Milwaukee, Wis., to inform them regarding the design, construction and application of the new Nopak-Matic line of solenoid and pilot-operated control valves, was held in San Francisco this spring. H. A. Nunnemacher, exec. vice pres., presided. Some of the representatives whose sales work takes them in close contact with the forest industries are back row, (l to r) **BERNIE COANE,** E. C. Griffin Co., Seattle; **KEN SULLEY,** Galbraith & Sulley, Ltd., Vancouver, B. C., **FRED HICKS,** chief engineer, Nopak-Matic Valve Division of Galland-Henning, Milwaukee; **H. A. NUNNEMACHER.** In front row (l to r) **BOB GALBRAITH,** Transmission Engineering Co., San Francisco; **ED SETZLER,** Cal-Ore Machinery Co., Medford, Ore.; **WES BATEMAN,** Jameson Machine Supply Co., Lewiston, Idaho; **EARL CALDWELL,** Caldwell Machinery Co., Portland; and **BOB GARNIK,** chief engineer, Nopak Air & Hydraulic Cylinder Division, Milwaukee.

Morton Appoints Vanderbilt To Handle "Lumber Cure"

• Morton Salt Co. announces that distribution of their "Lumber Cure" compound in the United States will now be handled by R. T. Vanderbilt, a New York City lumber chemical supply company. Vanderbilt will have exclusive sale and distribution rights.

Under the new contract agreement, Morton will continue to manufacture "Lumber Cure", a salt-based chemical compound which promotes more even lumber drying, for the Vanderbilt Company, but will take no part in the merchandising of the product.

• Caterpillar has named many new people to head departments of the Engine Division, which will move into a new plant near Peoria, Ill., starting next year, including ***J. H. Gill,*** sales manager, and ***W. E. Irwin,*** service manager.

Sisalkraft Promotes Two

NEW WESTERN division assistant sales manager for American Sisalkraft Corp. is JOSEPH W. SMITH. He will be based at San Francisco. Previously he was manager of the south Atlantic district for 16 years. Mr. Smith will work in the development of industrial markets for American Sisalkraft's reinforced waterproof papers produced at the Tracy, Calif., plant. J. R. "DICK" FINN has been named Chicago regional manager of industrial sales and will handle the merchandising and sales operations of "Fibreen" packaging papers. Mr. Finn has spent 10 years in paper industry sales.

SALEM FEED WORKS — *with improved braking action.*

There's a motor or arbor-drive model to fit your mill.

New developments in the SALEM feed:

1. Various sized brake cylinders, internal or external, to fit your particular need.
2. Design changes reducing maintenance cost.
3. New type lining for even smoother operation.

COME IN AND SEE OUR FEED WORKS ON DISPLAY or write for full particulars.

Salem Equipment & Supply Co.

Earl R. Hitchman, Pres.

3455 D Street • Salem, Oregon

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6 BIG ADVANTAGES

YOU GET WITH **DISSTON**

GENERATED TYPE CUTTER HEADS

1. No lost life in holding device. Generated cutter designed to use all the cutter form for cutting.
2. Generated cutter design gives equal cutter life in 4-6-8-10 or 12 knife heads.
3. Heads dynamically balanced to run smoother without vibration or chatter.
4. Greater throat room—no loading up and no chip marks on work.
5. Built-in chip breakers—no wear on heads from chips.
6. No holders, clamps or gibs—knife changes are quick and simple.

Got a cutter head problem? We'll be happy to supply you with any information you need on the application of Disston Generated Type Cutter Heads to your own specific problems. Write: Henry Disston Division, H. K. Porter Company, Inc., Philadelphia 35, Pa.

HKP Henry DISSTON DIVISION
H. K. PORTER COMPANY, INC.

New Equipment at Work

THIS VIEW of the "Chipveyor" shows blower unit at left, chip screen and feeder at right

Chips Go Air Express at Sawmill in Tuscaloosa, Ala.

• Faced with the problem of routing chips from chipper to loading point, Albert Holman Lumber Co., Tuscaloosa, Ala., has installed a pneumatic conveying system to do the job.

Designed specifically for the mill by Conveyair, and installed in two days under the supervision of Conveyair engineers, the "Chipveyor" handles eight units per hour and blows chips a distance of 400 feet and into box cars. Lightweight pipe was laid across rough, uneven ground, and elevated 30 feet to pass through an intervening building.

The "Chipveyor" gets its "big wind" from a 25 hp motor driving a Roots-Connersville blower, while a 3 hp motor takes care of the feeder drive through a 40:1 reducer. The Conveyair feeder features a mechanical air seal arrangement which prevents any loss of air pressure while chips are being fed into the system through the heavy steel rotor.

For car loading, a quick-change valve was built into the system some 60 feet from the discharge point and coupled to two branches. One leads to a flexible nozzle which can be manually traversed for blowing chips through the doors of standard box cars. The other leads to a cyclone for gravity feed into open-top cars.

New Resaws in California

• Molalla Forest Products Co., Cloverdale, Calif., (James Laier, pres., and Ben Haines, supt.) took delivery in late April of a new McDonough 54" vertical band resaw. The top wheel is a one-piece casting. The non-rotating top wheel shaft gives several times the strength of the conventional design. New also is the double column straining device. Hollow Tree Lumber Co., Ukiah, Calif., has installed a similar machine to their No. 3 mill. Idaco Equipment Co., California distributors for McDonough, made the deliveries.

Hardboard, Particleboard, Flakeboard Plant Directory

ABITIBI CORPORATION, Alpena, Mich.
HARDBOARD & INSULATION BOARD
* PRODUCTION: 700,000 sq. ft. daily (hardboard and insulation board)
* Production data 1/8-in. basis in millions square feet per year, unless otherwise stated.

ABITIBI POWER & PAPER CO., LTD., Sturgeon Falls, Ontario
PARTICLEBOARD
PRODUCTION: 16 million sq. ft./yr. estimated capacity (3/4-in. basis)

AMERICAN FURNITURE CO., Martinsville, Va. and N. Wilkesboro, N. C.
PARTICLEBOARD (captive plants)
PRODUCTION: 10 million sq. ft./yr. (3/4-in. basis)

AMERICAN PARBOARD CORP., P. O. Box 756, Black Mountain, N. C.
FLAKE BOARD
* PRODUCTION: 60,000,000 sq. ft./yr., estimated capacity
PERSONNEL: Pres. H. R. Tipton; Exec. vice-pres. D. B. Morgan, Jr.; Mgr. C. T. Sobol; Tech. Dir. A. H. Haigh; Plant Engr. W. D. Johnson
PROCESS: Miller Hofft; Multi-platen flakeboard
DATE OF PLANT START-UP: April, 1957
PANEL SIZE: 5x8-ft.
THICKNESSES: 1/2-in. to 1-1/4-in.
RAW MATERIALS: Appalachian hardwoods purchased in the form of cordwood
TRADE NAMES: Flakepli; Parboard
USES: Furniture trade, building material, high pressure laminates trade
CHARACTERISTICS: Flakeboard furnished either in homogeneous board or with a fines surface

ANACORTES VENEER CO., Anacortes, Wash.
HARDBOARD
* PRODUCTION: 28,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. Earl Cheldelin, Sls. Mgr. T. L. Bentley, Gen. Mgr. Gus N. Arneson, Supt. Arthur C. Carlson
PROCESS: Semi-dry
DATE OF PLANT START-UP: 1952
PANEL SIZE: 4x8-ft., 20-opening press
THICKNESSES: 1/8, 3/16, 1/4-in.
RAW MATERIALS: D fir and hemlock chips, molten wax, phenolic resin
SPEC. GRAVITY: 1.02 to 1.05
COLOR: Light brown
TRADE NAMES: Armorbord
USES: Overlay, pegboard

THE BERKLINE CORP., Morristown, Tenn.
PARTICLEBOARD (captive plant)
PRODUCTION: 2,400,000 sq. ft./yr. rated capacity (9/16-in. basis); 1,001,000 actual for 1956
PERSONNEL: Pres. Jacob Popkin, V Pres., Mgr. Lester Popkin, Supt. Clifford Rice, Quality Dir. Ken Petterson, Plant Engr. Frank Magill, Plant Controller, W. A. Thorn, Sls. Mgr. King Ray
PROCESS: Chipcraft; horizontal extrusion (24-in.)
DATE OF PLANT START-UP: 1953
PANEL SIZE: 45-in. width, random lengths
PERCENT INTO CUT-UP SIZES: 90%
THICKNESSES: 9/16-in.
RAW MATERIALS: Oak chips, urea, catalyst
USES: Ottoman ends and sides; TV swivel chair discs; panels; seat fronts

BOWATERS SOUTHERN PAPER CORP., Calhoun, Tenn.
Hardboard plant announced but plant yet to be constructed. Pilot research continues at Coos Bay, Ore. where facilities leased for experimental work.

BROWNSVILLE PARTICLE BOARD & ASSOC. PRODUCTS, INC., Brownsville, Ore.
PARTICLEBOARD
PRODUCTION: 14,000,000 sq. ft./yr. (1/2-in. basis)
PERSONNEL: Pres. and Mgr. Joseph E. Clark
PROCESS: Dry; Columbia Engineering Co.,
DATE OF PLANT START-UP: May 1957
PANEL SIZE: 4x8-ft.
THICKNESSES: 1/4 to 1-1/2-in.
RAW MATERIALS: Planer Shavings
SPEC. GRAVITY: 0.5 to 1.0
USES: Sheathing and specially constructed premium quality panels

BROYHILL FURNITURE FACTORIES, Lenoir, N. C. and Newton, N. C.
PARTICLEBOARD (captive plants)
PRODUCTION: 10 million sq. ft./yr. est. (3/4-in. basis)
PROCESS: Extrusion, 49-in. wide, 3/4-in. thick

CALDWELL FURNITURE CO., Lenoir, N. C.
PARTICLEBOARD (captive plant)
PRODUCTION: 5 million sq. ft./yr. est. (3/4-in. basis)
PROCESS: Extrusion, 49-in. wide, 3/4-in. thick

CANADIAN FOREST PRODUCTS, LTD., Braid St., New Westminster, B. C.
HARDBOARD
PRODUCTION: 54,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. J. G. Prentice, Plant Supt. D. M. Zilm, Supt. G. E. Burgon, Tech. Dir. T. Roubicek, Plant Engr. N. Springate, Gen. Sls. Mgr. W. E. Burns
PROCESS: Intermittent Deckle-box
DATE OF PLANT START-UP: 1948
PANEL SIZE: 4x8-ft.
THICKNESSES: 1/4, 3/16, 1/8-in.
RAW MATERIALS: Residue Veneer
TRADE NAMES: P. V. Brand Hardboard
USES: Industrial markets, wall panels, floor underlay
BOARD SPECIALTY TREATING: Tempering

COOS BAY TIMBER CO. (Georgia-Pacific Corp. subsidiary), Coos Bay, Ore.
HARDBOARD
PRODUCTION: 70 million sq. ft./yr. rated capacity (1/8-in. basis)
PERSONNEL: Vice Pres. Western Lbr. & Pulp Production (Geo.-Pac.) Robert E. Flowerree Jr., Plant Mgr. Jos. Stronko, Supt. A. Wehrle
PROCESS: Dry, air felted
DATE OF PLANT START-UP: 1953
PANEL SIZE: 4x16-ft.
PERCENT INTO CUT-UP SIZES: approx. 1/10
THICKNESSES: 3/32 to 3/8-in.
RAW MATERIALS: D. fir chips
SPEC. GRAVITY: 0.90 to 1.10
COLOR: light-natural fir
TRADE NAMES: Coos Bay Hdbd., C. B. Panelboard, C. B. Underlayment, C. B. Perforated Hdbd.
USES: Furniture, industrial, floor underlayment, wall paneling, home workshop, cabinets, garage door panels, veneer and plastic corestock and crossband, toys, fixtures and displays, overlay for Plyron
CHARACTERISTICS: S2S, high internal bond and machinability, tough edges

CAROLINA FOREST PRODUCTS, Box 1251, Wilmington, N. C.
FLAKEBOARD
PRODUCTION: 72,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. John Colucci, Jr.; Mgr. G. E. Kidder; Tech. Dir. R. H. Sides; Sales (Carolina Pacific Sales) John Colucci, Jr., L. G. Sprunt, K. M. Sprunt
PROCESS: Miller-Hofft--Multi-Platen
DATE OF PLANT START-UP: March, 1957
PANEL SIZE: Up to 4x10-ft.
PERCENT INTO CUT-UP SIZES: 50
THICKNESSES: 3/8 to 1-1/2-in.
RAW MATERIALS: Virgin southern hardwoods
SPEC. GRAVITY: 0.6
COLOR: Light brown
TRADE NAMES: Flake Ply
USES: Mainly for high pressure laminates
CHARACTERISTICS: M. R. 4100 lbs.; screw holding 330 lbs.
BOARD SPECIALTY TREATING: Overlayment

CASCADES PLYWOOD CORP. (Lebanite Div.) Lebanon, Ore.
HARDBOARD and PARTICLEBOARD
* PRODUCTION: 30,000,000 sq. ft./yr. estimated capacity
PERSONNEL: Pres. Charles W. Fox; vice pres. B. V. Hancock; Mgr. A. E. Anderson; Supt. Lubert Bemetz; Tech. Dir. J. R. Stillinger; Plant Engr. Jim Lewis; Sales Mgr. Lebanite Div. Orvie M. Johnson
PROCESS: Cascades Dry; continuous
DATE OF PLANT START-UP: Nov. 1956 (with new process)
PANEL SIZE: 4x8-ft.
PERCENT INTO CUT-UP SIZES: 20%
THICKNESSES: 1/10-in. to 4/8-in.
RAW MATERIALS: Green veneer chips
SPEC. GRAVITY: 1.00 to 1.20
COLOR: Cream to straw depending on specific gravity
TRADE NAMES: Lebanite and Lebanite PL-90
USES: All hardboard uses plus high pressure plastic laminating core material
CHARACTERISTICS: Finely divided particles felted on top and bottom. Light color
BOARD SPECIALTY TREATING: Striating; overlayment; perforating (round and square)

CAVALIER CORP., Chattanooga 2, Tenn.
PARTICLEBOARD
* PRODUCTION: 38,000,000 sq. ft./yr. rated capacity; 17,000,000 actual for 1956
PERSONNEL: Pres. Joseph H. Lane, Mgr. M. W. Moore, Supt. S. D. Weber, Sls. T. R. Loder
PROCESS: Miller Hofft; platen; dry
DATE OF PLANT START-UP: 1953
PANEL SIZE: 4x8-ft.
THICKNESSES: 5/8 to 7/8-in.
RAW MATERIALS: cabinet hardwood chips, urea resins
SPEC. GRAVITY: 0.60 to 0.65
COLOR: Varies by proportion of various species
TRADE NAMES: Lignabond
USES: Furniture panel core stock

CHAPMAN MANUFACTURING CO., Box 651, Corvallis, Ore.
HARDBOARD
* PRODUCTION: 25,000,000 sq. ft./yr. rated capacity; 25,185 actual for 1956
PERSONNEL: Pres. Charles Short; Mgr. Arthur VanderSys; Supt. Hugo Schmidt; Tech. Dir. K. G. Borchgrevink
PROCESS: Chapman (wet batch)
DATE OF PLANT START-UP: 1946
PANEL SIZE: 4x8-ft.; 4x4-ft.
PERCENT INTO CUT-UP SIZES: 10%
THICKNESSES: 1/10, 1/8, 3/16, 1/4-in.
RAW MATERIALS: Douglas fir, sawmill residue
SPEC. GRAVITY: 0.85 to 1.05
COLOR: Natural Douglas fir
TRADE NAMES: Oregonboard; Evanite Hardboard, Surfatex
USES: Building construction 75% (interior 80%, exterior 20%); furniture 17%; industrial 8%
CHARACTERISTICS: Color, workability, smooth surface, puncture resistant
BOARD SPECIALTY TREATING: Striating; tempering; corrugated; perforated and planked; rippled.

CHAPMAN OREGON LTD., Philomath, Ore.
PARTICLEBOARD
PRODUCTION: 10 million sq. ft./yr. est. rated capacity (3/8-in. basis)
PERSONNEL: Pres. Ralph Chapman, Sec.-Treas. B. N. Woods
PROCESS: Own development, 40-panel stack cold press
DATE OF PLANT START-UP: 1955 (experimentally)
PANEL SIZE: 4x8-ft.
THICKNESSES: 3/8-in.
RAW MATERIALS: D. fir, dry protein glue, repulped paper
CHARACTERISTICS: 3-ply panels with flake core and refined fiber faces

CHIPBOARD PRODUCTS, INC., Grants Pass, Ore.
PARTICLEBOARD
PRODUCTION: 20,000 sq. ft./day est. rated capac. (11/16-in. basis)
PERSONNEL: Pres.-Mgr. C. M. Starnes
PROCESS: Kriebaum, 48-in. vertical extrusion
DATE OF PLANT START-UP: 1955
RAW MATERIALS: D. fir, resin, size
USES: corestock

CLEAR FIR SALES CO., P. O. Box 188, Springfield, Ore.
PARTICLEBOARD
PRODUCTION: 30,000 sq. ft./day, 1/4-in. basis
PERSONNEL: Pres. W. H. Gonyea
PROCESS: Continuous, gravity formed
DATE OF PLANT START-UP: 1955
PANEL SIZE: 4x8-ft. (5-opening press)
THICKNESSES: 1/4-in. to 4/8-in.
RAW MATERIALS: Resin, sizing, dry coniferous by-product wood from parent plant
USES: Specialty items
BOARD SPECIALTY TREATING: Striating; overlayment; fancy native and exotic veneer overlays

COLUMBIA HARDBORD CO., Everett, Wash. (office, Box 1874, Seattle, Wash.)
FLAKEBOARD
PRODUCTION: 480,000 sq. ft. per day, (1/8-in. basis)
PERSONNEL: Pres. F. L. Johnson, Mgr. Dale Schubert, Supt. J. Ellis Mickler
PROCESS: Dry
DATE OF PLANT START-UP: Sept. 1956
PANEL SIZE: 50x98-in.
THICKNESSES: 1/4 to 1-in.
RAW MATERIALS: Cedar shavings
SPEC. GRAVITY: 0.65
TRADE NAMES: Cedawood

COLUMBIA WOOD PRODUCTS CO., Willamina, Ore.
PARTICLEBOARD
* PRODUCTION: 12,000,000 sq.ft./yr. rated capac.
PERSONNEL: Pres. A. K. Coddington, V. Pres. George Crone, Treas. W. L. Ford, Secy. Harry Devlin
PROCESS: Multi-platen; dry
DATE OF PLANT START-UP: May 1957
PANEL SIZE: 4x8-ft.
THICKNESSES: 1/4 to 1-in.
RAW MATERIALS: Planer shavings

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FRED E. BARNETT CO.
1455 Custer Avenue
SAN FRANCISCO 24, CALIF.

SPEC. GRAVITY: 40 to 60 lbs./cu. ft.
COLOR: Natural
USES: Door stock, curved chair backs, wall paneling

COREBOARD PRODUCTS CORP., Box 268, Raleigh, N. C.
PARTICLEBOARD
PRODUCTION: 5,000,000 sq. ft./yr. (¾-in. basis) rated capacity; 100,000 sq. ft. 1956 actual production due to moving plant from Belhaven, N. C.
PERSONNEL: Pres. and Mgr. G. Hodges Bryant; Supt. L. R. Wright; Tech. Dir. M. L. Bell; Plant Engr. L. R. Wright
PROCESS: Dry, flat bed, hot press "Bryant Process", special-designed production line.
DATE OF PLANT START-UP: May, 1955
PANEL SIZE: 4x8-ft.
PERCENT INTO CUT-UP SIZES: 12%
THICKNESSES: ¾ to 2-in.
RAW MATERIALS: Shavings, sawdust, slabs
SPEC. GRAVITY: 0.64 to 0.72 plus
COLOR: Natural pine or simulated to any desired color, walnut, mahogany, cherry, etc., by additives at the mixer
TRADE NAMES: ALLPUR; PRESS-SHA
USES: Corestock- furniture, tabletops, building trade, store fixtures, radio and TV cabinets
CHARACTERISTICS: Low water absorption, fine texture, workability
BOARD SPECIALTY TREATING:
CHANGES OF PAST 12 MONTHS: Closed in Feb. 1956 to relocate. Expect to be back in production by June, 1957. Have completed process for color additives while pressing

CROSSETT LUMBER CO., Crossett, Arkansas
MOLDED PRODUCTS
PRODUCTION: 1220 plugs/hr.
PERSONNEL: Mgr. H. S. Mersereau, Supt. S. E. Helm, Tech. Dir. W. L. Lear, Plant Engr. E. B. Brown
PROCESS: Chipcraft moulding unit
DATE OF PLANT START-UP: No. 1—Feb. 1956, No. 2—Dec. 1956
PANEL SIZE: (Plug size) 2-9/16 to 5-1/16-in. Dia.
USES: Paper roll plugs

CURTIS COMPANY, INC., Clinton, Iowa
PARTICLEBOARD (captive plant)
PRODUCTION: 1,000,000 sq. ft./yr. rated capac. (¼-in. basis)
PERSONNEL: Mgr. H. O. Sugg
PROCESS: Dry, 5-opening, 4x4-ft. press
DATE OF PLANT START-UP: 1948
RAW MATERIALS: P pine, sawdust, resin
TRADE NAMES: Prespine
USES: Drawer bottoms, door panels, cabinets

DIXIE CHIPBOARD CO., Rural Hall, N. C.
PARTICLEBOARD
PRODUCTION: 5 million sq. ft./yr. est. capac. (½-in. basis)
PROCESS: extrusion, two 49-in. machines
DATE OF PLANT START-UP: 1954
THICKNESSES: ½-in.
RAW MATERIALS: softwood and hardwood

DOMINION PRIME WOOD PRODUCTS, LTD., Lachute, Que., Can.
MOLDED PRODUCTS
PRODUCTION: 3 million molded plugs/yr. est. capacity
PERSONNEL: Mgr. Jacques Bedard
PROCESS: Chipcraft; automatic molding unit
DATE OF PLANT SET-UP: 1955
USES: Paper plugs

DURATEX S/A-INDUSTRIA E COMMERCIO, Box 7611, Sao Paulo, Brazil
HARDBOARD
* PRODUCTION: 36 million sq. ft./yr. rated capac.
PERSONNEL: Pres. Dr. Alfredo Egydio de Souza Aranha, Vice Pres. Dr. Luiz Moraes Barros, Vice Pres. Dr. Domingos Quirino Ferreira Netto, Man. Dir. Dr. Eudoro L. Villela, Man. Dir. Nivaldo Coimbra de Ulhoa Cintra, Gen. Mgr. Carlos R. Vieitas
PROCESS: Swedish, Asplund Defibrators
DATE OF PLANT SET-UP: 1955
PANEL SIZE: 1.22x2.50-3.00 meters
PERCENT INTO CUT-UP SIZES: 20%
THICKNESSES: 2.5-6.0 mms.
RAW MATERIALS: Eucalyptus chips, paraffin, vegetable resin, alum
SPEC. GRAVITY: 1.0
COLOR: Light brown
TRADE NAMES: Duratex
USES: Building construction (18% interior, 20% exterior), furniture 60%, automobile mfg. 20%, industrial 40%
CHARACTERISTICS: Flexible, insect-proof, uniform surface, free of split and warp; oil tempered board is weatherproof
BOARD SPECIALTY TREATING: Packings, prefabricated housing, acoustic ceiling with glass wool

FIBRACEL, S. A., Londres 258, Esp. Sevilla, Mexico 6, D. F.
HARDBOARD
* PRODUCTION: 45,000,000 sq. ft./yr. rated capacity; 40,000,000 actual for 1956
PERSONNEL: Gen. Dir. Baltasar Marquez, Mgr. Jose Antonio Ruiz Duarte, Supt. Raul Madrazo, Tech. Dir. Ing. J. A. Ruiz Duarte, Plant Engr. J. Ramon Casillas, Sls. Mgr. Genaro Barroso, Maint. Engr. Silvestre Revueltas.
PROCESS: Wet
DATE OF PLANT START-UP: 1950
PANEL SIZE: 4x6-ft., 8-ft., 10-ft., 12-ft.
THICKNESSES: 1/10, ⅛, 3/16, ¼-in.
RAW MATERIALS: Tropical hardwoods
SPEC. GRAVITY: 1.00 average
COLOR: Brown
TRADE NAMES: Fibracel Duro-3, Fibracel Duro-5, Fibracel tablero, Fibracel Perforando, Fibracel Extraduro-3, Extraduro-5
USES: Interior, exterior construction; furniture, industrial, partition, TV cabinets, packings and doors
CHARACTERISTICS: Strength and flexibility
BOARD SPECIALTY TREATING: Tempering; laminated

FOREST FIBER PRODUCTS CO., Box 681, Forest Grove, Ore.
HARDBOARD
* PRODUCTION: 60,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. Harold A. Miller; Gen. Mgr. F. M. (Tom) Hughes; Plant Supt. G. E. Tower; Tech. Dir. Keith Kruse; Plant Engr. Clyde Mason
PROCESS: Wet
DATE OF PLANT START-UP: June 1949
PANEL SIZE: 4x16-ft.
PERCENT INTO CUT-UP SIZES: 10%
RAW MATERIALS: Douglas fir
COLOR: Light—color of Douglas fir
TRADE NAMES: Tee-N-Gee; Forest Sandalwood; Forestex; Forall; Foron; Punchboard
USES: Walls, fixtures, cupboard and sliding doors and siding
CHARACTERISTICS: Light color, prefinished, sand color
BOARD SPECIALTY TREATING: Striating; overlayment; tongue and groove; tempering; prefinishing and siding
CHANGES OF PAST 12 MONTHS: Doubled tempering capacity; 5 new products, prefinishing and adding color

FORMICA CORPORATION, Farmville, N. C.
FLAKEBOARD
PRODUCTION: Not determined
PERSONNEL: Plant Mgr. T. Canning, Tech. Dir. A. J. Heeb
PROCESS: Press; Multi-Platen
DATE OF PLANT START-UP: Jan. 1958
PANEL SIZE: Up to 6x12-ft.
THICKNESSES: ¼ to 1¼-in.
RAW MATERIALS: Pine
SPEC. GRAVITY: 0.60 to .85
COLOR: Light pine
TRADE NAMES: Formica Flakeboard
USES: With Formica decorative laminates

GRANIE BOARD, INC., Div. of National Starch Products, Inc., Goffstown, N. H.
PARTICLEBOARD
PRODUCTION: 11,000,000 sq. ft./yr. rated capacity (¾-in. basis)
PERSONNEL: Pres. Herbert Hermsdorf; Plant Mgr. Paul Brusquini; Plant Supt. George Hermsdorf; Tech. Dir. C. G. Caldwell; Mgr. Structural Prod. Div., A. G. Battaglia.
PROCESS: Flat Platen
DATE OF PLANT START-UP: 1954
PANEL SIZE: 4x8-ft.
PERCENT INTO CUT-UP SIZES: 75%
THICKNESSES: ½ to 1-3/16-in. in 1/16-in. graduations
RAW MATERIALS: Eastern White Pine
SPEC. GRAVITY: 0.65
COLOR: Light tan
TRADE NAMES: Granite Board
USES: Core stock for furniture dinette tables, sink-tops, and hardwood plywood; underlayment
CHANGES OF PAST 12 MONTHS: Installed 15-opening press

GRAY PRODUCTS CO., INC., Waverly, Virginia
FLAKEBOARD
PRODUCTION: 25,000,000 sq. ft./yr. (¾-in. basis) rated capacity
PERSONNEL: Pres. Elmon T. Gray; Plant Mgr. E. A. Jarrett; Tech. Dir. J. W. Coufal; Vice pres. in charge of Sales, Richmond Gray
PROCESS: Miller-Hoffft Co.; platen process
DATE OF PLANT START-UP: August 1957
PANEL SIZE: 5x10-ft.
THICKNESSES: ⅜ to 1¼-in.
RAW MATERIALS: Pine slabs and rounds; possibility of poplar slabs and rounds
SPEC. GRAVITY: 36 to 44 lb. board pcf
COLOR: beige
USES: Furniture core, building
CHARACTERISTICS: Minimum MOR of 3000 lbs.; MOE of approx. 500,000 lbs.—very tight edge
BOARD SPECIALTY TREATING: Homogeneous or with fine overlay

GULF NAVAL STORES CO., P. O. Box 987, Gulfport, Miss.
PRODUCTION: Hardboard plant in experimental stage of operations. Production expected during 1958.

HARDY AND CO., INC., Box 246, Little Rock, Ark.
HARDBOARD
* PRODUCTION: 30,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. Robert L. Hardy, Mgr. Travis W. McCoy, Jr., Tech. Dir. Mark A. Brandjord, Pers. Dir. Howard Fulmer, Sls. Mgr. R. L. Adams
PROCESS: Chapman; wet
DATE OF PLANT START-UP: March, 1957
PANEL SIZE: 4x8-ft.
THICKNESSES: ⅛, 3/16, ¼-in.
RAW MATERIALS: Southern yellow pine
SPEC. GRAVITY: 1.0 to 1.02
COLOR: Light blond
TRADE NAMES: "Hardyboard"
USES: Furniture, auto, office equip., TV and radios, mirror backing, aircraft
CHARACTERISTICS: MOR 5,000 lbs. plus
BOARD SPECIALTY TREATING: Overlayment; tempering

HART WOOD PRODUCTS, INC., Hart, Mich.
PARTICLEBOARD
* PRODUCTION: 3,000,000 sq. ft./yr. rated capacity; 300,000 actual for 1956
PERSONNEL: Pres. W. Lionel Tate, Supt. Tech. Dir. and Plant Engr. Alden Wiedman
PROCESS: Chip Craft vertical extrusion
DATE OF PLANT START-UP: 1956
PANEL SIZE: 4x6, 4x8, 4x10, 4x12-ft.
THICKNESSES: ½, ¾, ⅝, 1, 1⅛-in.
RAW MATERIALS: Aspen, oak, birch, maple
SPEC. GRAVITY: 45 lbs. per cu. ft.
COLOR: Light
TRADE NAMES: Hart Board
USES: Underlayment, paneling, plastic and wood laminates
CHARACTERISTICS: Excellent for plastic and wood laminating. Extra screw holding.
BOARD SPECIALTY TREATING: Veneering

HICKORY MFG. CO., Box 493 Annex, Hickory, N. C.
PARTICLEBOARD (captive plans)
PRODUCTION: 800,000 sq. ft./yr. rated capac. (3/16-in. basis); 1956 experimental boards
PERSONNEL: Pres. C. T. Bost; Supt. M. C. Turbyfill; Plant Engr. C. T. Bost, Sr.
PROCESS: Hot planten press
DATE OF PLANT START-UP: Feb. 1957
PANEL SIZE: 64x108-in.
PERCENT INTO CUT-UP SIZES: 100%
THICKNESSES: 13/16-in.
RAW MATERIALS: Dried wood waste
COLOR: Varies according to material used
USES: Core stock

INSULITE DIV., M&O PAPER CO., Natchez, Miss.
HARDBOARD
PROCESS: wet felted, screen back

INTERNATIONAL PAPER CO., Long Bell Division, Longview, Wash.
FLAKEBOARD
PRODUCTION: 20,000,000 sq. ft./yr. rated capacity (¼-in. basis)
PERSONNEL: Pres. R. C. Doane, Mgr. T. A. Deal, Supt. W. R. Kletsch, Tech. Dir. A. L. Mottet, Sls. Mgr. F. L. Foval
PROCESS: Long Bell Crosscut Flakeboard
DATE OF PLANT START-UP: March 1951
PANEL SIZE: 4x8-ft.
PERCENT INTO CUT-UP SIZES: 35%
THICKNESSES: 1/16 to ¾-in.
RAW MATERIALS: Planer ends, mill trims
SPEC. GRAVITY: 0.6 to 1.0
COLOR: Natural wood
TRADE NAMES: Flakewood, Ven-O-Wood
USES: Wallboard, furniture, industrial
BOARD SPECIALTY TREATING: Tongue & groove; planks and parquet squares
CHANGES OF PAST 12 MONTHS: Addition of Buss planer to supply board with precision thickness specifications

THE JASPER AMERICAN MFG. CO., Henderson, Ky.
PARTICLEBOARD
* PRODUCTION: 24,000,000 sq. ft./yr. rated capacity; 16,000,000 actual for 1956
PERSONNEL: Pres. A. F. Habig; Mgr. N. L. Kuper; Tech. Dir. M. R. Kuper
PROCESS: Kreibaum - extrusion
DATE OF PLANT START-UP: May 1954
PANEL SIZE: 48-in. long, all widths
PERCENT INTO CUT-UP SIZES: 100%
THICKNESSES: ½ to 1⅞-in.
RAW MATERIALS: Hardwood
SPEC. GRAVITY: 0.65
TRADE NAMES: Stylemaster Chipcore
USES: Core board
CHARACTERISTICS: Solid and tubular extruded

JOHNS-MANVILLE CORP., Natchez, Miss.
HARDBOARD
PRODUCTION: Plant under construction, est. capac. 60 million sq. ft./yr. (⅛-in. basis)

KROEHLER MANUFACTURING CO., Meridian, Miss.
PARTICLEBOARD
PRODUCTION: Unknown

THE LANE CO., INC., Altavista, Virginia
PARTICLEBOARD (captive plans)
* PRODUCTION: 42,300,000 sq. ft./yr. (3 shift basis) rated capacity; 23,750,000 actual for 1956
PERSONNEL: Pres. H. O. Powell; Mgr. E. H. Lane, Jr.; Supt. F. T. Holland; Tech. Dir. E. W. Davidson; Plant Engr. C. B. Sumpter; Chairman of Bd., E. H. Lane, Sr.
PROCESS: Lanewood Horizontal Extrusion
DATE OF PLANT START-UP: 1948 as multi-platen, discontinued in favor of extrusion starting production 1953
PANEL SIZE: 48-in. wide, any length
THICKNESSES: 9/16 to 21/16-in.
RAW MATERIALS: Miscellaneous species chips, urea-formaldehyde resin
SPEC. GRAVITY: 0.62 to 0.67
COLOR: Variable
TRADE NAMES: Lanewood
USES: Furniture core stock
CHARACTERISTICS: Uniform, economical product; excellent machinability

LANE PACIFIC WOOD PRODUCTS, Junction City, Ore.
PARTICLEBOARD
PERSONNEL: Pres. Delmer Lynch
Construction of plant anticipated for indefinite future.

MASONITE CO. OF CANADA, LTD., Gatineau, Quebec, Canada
HARDBOARD
* PRODUCTION: 115,000,000 sq. ft./yr. estimated capacity; 85,000,000 actual for 1956
PERSONNEL: Pres. P. A. Sargent; Mgr. R. M. Archer; Supt. J. C. Copeland; Tech. Dir. M. J. Lessard; Plant Engr. K. W. Noble
PROCESS: Masonite—steam explosion
DATE OF PLANT START-UP: 1940
PANEL SIZE: 4x16-ft.
PERCENT INTO CUT-UP SIZES: 100%
THICKNESSES: ⅛, 3/16, ¼, 5/8-in.
RAW MATERIALS: Jack pine chips; slabs
SPEC. GRAVITY: 1.00
COLOR: Dark brown
TRADE NAMES: Masonite brand products; Masonite Presdwood, etc.
USES: Housing, walls, ceilings, floors, cabinets, siding, industrial uses, fabricated parts.
CHARACTERISTICS: Uniform, grainless, stable, tough, easily fabricated
BOARD SPECIALTY TREATING: Tongue & groove; tempering; leather pattern

MASONITE CORPORATION, Laurel, Miss. and Ukiah, Calif.
HARDBOARD
* PRODUCTION: 1,100,000,000 sq. ft./yr. rated capacity (Ukiah 230MM, Laurel 870MM)
PERSONNEL: Pres. John M. Coates, Vice Pres. Mfg. Wm. A. Cotton, vice Pres. Sls. Paul B. Shoemaker, Gen. Sls. Mgr. F. O. Marion, Vice Pres., Gen. Mgr., Laurel Donald J. Gray, Res. Mgr., Ukiah C. H. Gordon Dixon, Res. Dir. Robert Boehm, Chief Engr. Frank Lesniak
PROCESS: Exploded wood fiber process, wet and semi-dry
DATE OF PLANT START-UP: 1926 at Laurel, Ukiah 1951
PANEL SIZE: Up to 5x16-ft.
THICKNESSES: 1/10 to 2-in.
RAW MATERIALS: Hard and soft wood
SPEC. GRAVITY: 0.9 to 1.4
COLOR: Brown
TRADE NAMES: Masonite Presdwood, Tempered Presdwood, Panelwood, Underlayment, Tempered Duolux, Dorlux, Temprtile, Leatherwood, Ridgeline, Pegboard, Shadowvent Siding, Panelgroove, Ridgegroove, Concrete Form Presdwood, Benelex, Primecote Products, Seadrift, Panelply
USES: Building and industry; walls, ceilings, cabinets, underlayment, siding, decorative specialties, bathroom and kitchen "tiles", concrete forms
CHARACTERISTICS: Smooth, dense, wear-resistance surface
BOARD SPECIALTY TREATING: Striating; tempering; embossed patterns, grooving and priming
CHANGES OF PAST 12 MONTHS: New patterns

MILLER HOFFT, INC., Richmond, Va.
PARTICLEBOARD
PRODUCTION: pilot-plant — organization designs and constructs plants
PERSONNEL: Pres. H. C. L. Miller

MISSISSIPPI PRODUCTS, INC., Box 492, Jackson, Miss.
PARTICLEBOARD (captive plans)
* PRODUCTION: 14,336,000 gross sq. ft./yr. rated capacity; 11,060,967 net. ft. actual for 1956
PERSONNEL: Pres. George A. Huth, Oper. Mgr. G. F. Bracken, Mill Supt. G. R. Twyman, Wood Technologist, J. E. Griffith, Plant Engr. G. H. Robinson, Ch. Prod. Engr. F. W. Preuss.
PROCESS: Multi-platen
DATE OF PLANT START-UP: Dec., 1953
PANEL SIZE: 48x96-in. untrimmed
PERCENT INTO CUT-UP SIZES: 100%
THICKNESSES: ¼ - 1⅛-in.
RAW MATERIALS: Southern Hardwoods
SPEC. GRAVITY: 0.65 to 0.70
COLOR: Light cream (natural wood color)
TRADE NAMES: Nu-Tex
USES: Core stock and exposed decorative panels
BOARD SPECIALTY TREATING: Moisture equalized

MONTANA HARDBOARD, Missoula, Mont.
HARDBOARD

NEALL PRESSED PRODUCTS CO., 3rd & Cherry Sts., San Leandro, Calif.
PARTICLEBOARD
PRODUCTION: 5,000,000 to 6,000,000 sq. ft./yr. (⅜-in. basis)
PERSONNEL: Pres. Francis M. Neall; Tech. Dir. Fred Hughes; Sales Mgr. William E. Hall
PROCESS: Dry mix
DATE OF PLANT START-UP: Nov. 1955

Now, The Successor To Ordinary Hardboard . . . .
THE FIRST PREFINISHED HARDBOARD IN COLOR!

Yes, it's here! FOREST Sandalwood, the prefinished platinum beauty that makes all ordinary hardboard obsolete. Sandalwood is temper-treated with an attractive platinum surface baked in.

Panels come in thicknesses from ⅛" to ¾" in sizes from 4' x 4' to 4' x 16'. For more information write

FOREST FIBER PRODUCTS CO.

P. O. Box 68L, Forest Grove, Oregon

Now! Portalloy rubber covered camel back chain for use in selective transfer handling

Special Non-Marking White Rubber Is Used To Eliminate Bruising • The Rubber Is An Integral Part of Chain

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PORTLAND CHAIN MANUFACTURING CO.

IN THE HEART OF THE LOGGING INDUSTRY

4800 N.W. Yeon • Portland, Oregon • CApitol 6-7419

PANEL SIZE: 48x96-in.
THICKNESSES: ⅜, ½, ⅝, ¾-in.
RAW MATERIALS: California incense cedar
SPEC. GRAVITY: 40 lb./cu. ft.
COLOR: Cedar
TRADE NAMES: Ced-O-Bord
USES: Cabinets, shelves, underlayment floors, plastic lamination core, hardwood veneer cores
CHARACTERISTICS: Smooth surfaces with tight core

NEW ENGLAND INDUSTRIES, High Point, S. C.
PARTICLEBOARD
PRODUCTION: 10 million sq. ft./yr. estimated (¾-in. basis)
PROCESS: Extrusion, 49-in. wide, ¾-in. thick

NU-PLY INC., Bemidji, Minn.
HARDBOARD (and Nu-Ply—fiber core overlayed with hardwood veneer)
• PRODUCTION: 20 million sq. ft./yr.
PERSONNEL: Pres. A. C. Nasvik; Sls. Mgr. E. J. Murphy; Supt.-Plant Mgr. E. R. Eggers; Tech. Dir. Arnold Luhning
PROCESS: Elmendorf, dry, S2S
DATE OF PLANT START-UP: 1956
PANEL SIZE: 4x8-ft.
THICKNESSES: ⅛ thru ¾-in.; Nu-Ply ¼, ½, ¾, 1-in.
RAW MATERIALS: Aspen chips
SPEC. GRAVITY: 0.70 to 1.10
COLOR: Light
TRADE NAMES: Nu-Ply, Perfo-Ply, Nu-Plank (t&g), Nu-Bord
USES: Interior construction 20%, furniture 20%, auto manufacturing 25%, industrial 35%
BOARD SPECIALTY TREATING: Random width plank, punched boards

OWOSSO MANUFACTURING CO., Benton, Ark.
PARTICLEBOARD (captive plant)
PRODUCTION: 1½ million sq. ft./yr. estimate capacity (11/16-in. basis)
PROCESS: Extrusion, 24-in. wide
THICKNESSES: 11/16-in.

PACQUA, INC., (Subsidiary of Pacific Plywood Co.), Box 78, Dillard, Ore.
PARTICLEBOARD
PRODUCTION: 10,000,000 sq. ft. 250-day yr. (¾-in. basis)
PERSONNEL: Pres. Wm. F. Forrest, Mgr. Wm. H. Cooke, Supt. R. G. Frashour, Plant Engr. Leland Stadig
PROCESS: Hammermill Co. designed process
DATE OF PLANT START-UP: Summer 1957 (est.)
PANEL SIZE: 48x96-in.
THICKNESSES: ⅜ to 1¼-in.
RAW MATERIALS: Green Douglas fir veneer residue, resin, size
SPEC. GRAVITY: 0.60 to 0.95
COLOR: Light
USES: Construction, furniture core

POINSETTE LBR. & MFG. CO., Pickens, S. C.
PARTICLEBOARD (captive plant)
PRODUCTION: 5 million sq. ft./yr. estimated capacity (11/16-in. basis)
PROCESS: Multi-platen press
PANEL SIZE: 4x8-ft.
THICKNESSES: 11/16-in.

POPE & TALBOT, 3070 N. W. Front Ave., Portland, Ore. Plant under construction at Oakridge, Ore.
PARTICLEBOARD, FLAKEBOARD
• PRODUCTION: 88,000,000 sq. ft./yr. rated capacity
PERSONNEL: Vice Pres. H. Lueddemann; Mgr. L. Fuchek; Supt. R. Poinecke; Tech. Dir. C. Rausch; Plant Engr. D. Boomer; Special Products K. Guenther
PROCESS: Miller-Hofft
DATE OF PLANT START-UP: Summer 1957
PANEL SIZE: 48x96-in.
THICKNESSES: ⅜ to 1-in.
RAW MATERIALS: Shavings and flakes
SPEC. GRAVITY: 35 to 60 lbs./cu. ft.
COLOR: Light tan
TRADE NAMES: Pope & Talbot Particle Board
USES: Industrial and building trades
CHARACTERISTICS: Laminated surface; close thickness and density tolerances; with or without flake content

ROCK ISLAND MILLWORK CO., 2525 Fourth Ave., Rock Island, Ill.
PARTICLEBOARD (captive plant)
• PRODUCTION: 20,000,000 sq. ft./yr. rated capacity
PERSONNEL: Vice Pres. E. A. Gerber; Sls. Mgr. H. S. Kattrick; Tech. Dir. Dave Halle
PROCESS: Resinwood (dry)
DATE OF PLANT START-UP: 1949
PANEL SIZE: 49x97-in.
PERCENT INTO CUT-UP SIZES: 10%
THICKNESSES: 3/16, ¼, 9/32, ⅜, ½-in.
RAW MATERIALS: Ponderosa pine sawdust, powdered thermosetting phenolic resin
SPEC. GRAVITY: 0.9 to 1.1
COLOR: Similar to Ponderosa Pine
TRADE NAMES: Resinwood, Resincore
USES: 5% interior and 5% exterior building construction, 80% furniture, 10% industrial. Cabinets, table tops, panel stock, core for high pressure decorative plastic laminates.
CHARACTERISTICS: Highly durable work surface

RODDISCRAFT, INC., P. O. Box 248, Arcata, Cal.
FLAKEBOARD
PRODUCTION: 15,000,000 sq. ft./yr. (¾-in. basis) estimated capacity
PERSONNEL: Gen. Mgr. Kirk Cooper; Plant Mgr. Robert Molloy; Supt. Roy Hunt; Tech. Dir. Bill Ferry; Plant Engr. Ralph Davis
PROCESS: Behr - Homogenholz
DATE OF PLANT START-UP: April 1957
PANEL SIZE: 4x16-ft.
PERCENT INTO CUT-UP SIZES: 25%
THICKNESSES: ⅜, ½, ⅝, ¾, 1⅛-in.
RAW MATERIALS: Shavings of native species
SPEC. GRAVITY: 0.60
COLOR: White fleck
TRADE NAMES: Timboard
USES: Furniture core
CHARACTERISTICS: Quality board, close tolerances
BOARD SPECIALTY TREATING: Overlayment

SACTO WOOD MOLDING PRODUCTS, North Sacramento, Calif.
PARTICLEBOARD
PRODUCTION: 1 million sq. ft./yr. estimated capacity (½-in. basis)
PROCESS: Multi-platen press

SCOTTDALE WOOD PRODUCTS, Scottdale, Pa.
PARTICLEBOARD
PRODUCTION: 3 million sq. ft./yr. estimated (¾-in. basis)
PROCESS: Extrusion, 49-in. wide, ¾-in. thick

SENCORE INDUSTRIES, Fernwood, Miss.
PARTICLEBOARD
PRODUCTION: 3 million sq. ft./yr. estimated (¾-in. basis)
PROCESS: Multi-platen, 4x8-ft.

SOUHEGAN WOOD PRODUCTS INC., Wilton, N. H.
PARTICLEBOARD
PRODUCTION: 6 million sq. ft./yr. estimated

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(⅜-in. basis)
PROCESS: Multi-platen press
THICKNESSES: ⅜ - ⅞-in.

SOUTHERN BOX & LUMBER CO., Wilmington, N. C.
PARTICLEBOARD
PROCESS: Multi-opening hot press

SOUTHERN PLASWOOD CORP., Box 123, Hope, Ark.

PARTICLEBOARD
* PRODUCTION: 12,500,000 sq. ft./yr. rated capacity; 5,000,000 actual for 1956
PERSONNEL: Pres. Guy E. Besye, Mgr. Roy Anthony, Supt. E. J. Ogren
PROCESS: Plaswood
DATE OF PLANT START-UP: 1950
PANEL SIZE: 4x8-ft.
PERCENT INTO CUT-UP SIZES: 10%
THICKNESSES: ½ to 1¼-in.
RAW MATERIALS: Shavings and edgings
COLOR: Similar to lumber
TRADE NAMES: Plaswood
USES: Underlayment, core stock, sheathing
BOARD SPECIALTY TREATING: Tongue & groove

SOUTHERN PLYWOODS, INC., Box 448, Greenville, Fla.
PARTICLEBOARD
PRODUCTION: Operating pilot plant
PERSONNEL: Asst. Mgr. Peter J. Stern

SUPERWOOD CORPORATION, Duluth, Minn.
HARDBOARD
* PRODUCTION: 80 million sq. ft./yr.
PERSONNEL: Pres. M. J. Opsahl, Vice Pres. K. V. Hafner & G. A. Jondal, Tech. Dir. G. C. Fawsom
PROCESS: Chapman, wet batch
DATE OF PLANT START-UP: 1949
PANEL SIZE: 4x8-ft.
PERCENT INTO CUT-UP SIZES: 5%
THICKNESSES: 1/10, ⅛, 3/16, ¼, 5/16 in.
RAW MATERIALS: Aspen chips, phenolic resin
SPEC. GRAVITY: 1.00 - 1.02
COLOR: Blonde
TRADE NAMES: Superwood
USES: Siding, underlayment, panel stock, tempered and standard hardboard
BOARD SPECIALTY TREATING: Tempering, lap siding with attached shadowline strip

SWAIN INDUSTRIES, Seymour, Ind.
PARTICLEBOARD
PRODUCTION: 5 million sq. ft./yr. estimated capacity (¾-in. basis)
PERSONNEL: Pres. B. F. Swain
PROCESS: Multi-platen press
DATE OF PLANT START-UP: 1947
PANEL SIZE: 4x8-ft.
THICKNESSES: ¾-in.
RAW MATERIALS: Furniture residue wood
USES: Furniture stock

THE TEMPRON CORP., Box 44, El Paso, Texas
HARDBOARD
* PRODUCTION: 100,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. J. F. T. Berliner, Vice Pres. J. B. Graves, Mgr. H. K. Linzell, Sls. Mgr. J. G. Stemples
DATE OF PLANT START-UP: Expected in 1958
PANEL SIZE: Up to 16-ft. lengths
THICKNESSES: ⅛-in. and thicker
RAW MATERIALS: Creosote bush wood
SPEC. GRAVITY: 1.0 to 1.1
COLOR: Mahogany
TRADE NAMES: Tempron
USES: Building and industrial
CHARACTERISTICS: Smooth, two-side
BOARD SPECIALTY TREATING: Tempering

TENEX, INC. (Pack River Tree Farm Products), Sandpoint, Idaho (doubling capacity here in '57 by adding 2nd line; 2-line plant to be built at Coeur d'Alene, Ida. by early '58)
FLAKEBOARD
PRODUCTION: 60 tons per day (¼-in. basis) rated capacity; capacity scheduled for 500-600% increase in 12 mos.
PERSONNEL: Pres. J. M. Brown, Jr.; Gen. Mgr. Irvin Wentworth; Plant Mgr. Wayne Long.
PROCESS: Tenex Dry
DATE OF PLANT START-UP: 1955
PANEL SIZE: 4x16-ft.
THICKNESSES: ¼-in.
RAW MATERIALS: Sawmill residues
COLOR: Natural
TRADE NAMES: Tenex
USES: Waferwood textured panels for walls, ceilings, cabinets and all interior decorative purposes

THOMASON PLYWOOD CORP., Fayetteville, N. C.
PARTICLEBOARD (captive plant)
PRODUCTION: 2,000,000 sq. ft./yr. rated capacity (1⅛-in. basis)
PERSONNEL: Pres. B. H. Thomason; Mgr. J. A. Barnes
PROCESS: Chipcraft; vertical extrusion
DATE OF PLANT START-UP: Nov., 1955
PANEL SIZE: 49x144-in.
THICKNESSES: ¾, 1⅛, 1-9/16-in.
RAW MATERIALS: Hardwoods and pine
USES: Captive plant

TRAFALGAR MILLS, LTD., South Nelson, New Brunswick
PARTICLEBOARD
PRODUCTION: 3.5 million sq. ft./yr. estimated capacity (¾-in. basis)
PROCESS: Multi-platen hot press

UNITED STATES PLYWOOD CORP., Box 1688, Redding, Calif.
FLAKEBOARD (3-layer)
* PRODUCTION: 270,000,000 sq. ft./yr. rated capacity; 190,000,000 actual for 1956
PERSONNEL: Gen. Mgr. Ken Morrow, Prod. Mgr. Warren Smith, Asst. Prod. Mgr. Richard Bailey, Supt. Wm. Marander, Tech. Dir. Bruce Jones, Plant Engr. Vern Daniels, Qual. Control, Neil Beatty
PROCESS: Novoply (3 ply)
DATE OF PLANT START-UP: May, 1951
PANEL SIZE: 6x12, 4x16-ft.
PERCENT INTO CUT-UP SIZES: 65%
THICKNESSES: 3/8, ½, ⅝, 11/16, 1, 1-1/16, 1⅛, 1-3/16, 1¼, 1⅜, 1-13/32, 1½, 1⅝, 1¾, 2-in.
RAW MATERIALS: Douglas fir, W. fir, P. Pine and S. Pine chips for core; D. fir peeler cores for face shavings
SPEC. GRAVITY: 0.62 to 0.71 (Lower densities in panels over 1¼-in.)
COLOR: Douglas fir color
TRADE NAMES: Novoply
USES: Building construction (interior); sliding doors, folding doors, wall paneling, single wall partitions, cabinets. Furniture, as core stock and natural sink tops; desks.
CHARACTERISTICS: Attractive mosaic surface appearance. Very flat, warp free, high strength, water resistant. Ideal as core stock without cross banding. Many used overlaid one side only.
BOARD SPECIALTY TREATING: Cut to size and edge banding
CHANGES OF PAST 12 MONTHS: Greater thickness and uniformity

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UNITED STATES PLYWOOD CORP., Youngs Bay Lumber Div., Roseburg, Ore.
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U. S. GYPSUM CO., Greenville, Miss. and Pilot Rock, Ore., latter being owned and formerly operated by Oregon Fibre Products, Inc.
HARDBOARD
PRODUCTION: 71 million sq. ft. per year capacity at Greenville plant, 120 million at Pilot Rock (⅛-in. basis)
PERSONNEL: Pilot Rock—Works Mgr. O. W. Frost
PROCESS: Pilot Rock—wet forming (continuous), dry pressing; plant start-up 1954. Greenville—formed wet, pressed dry; plant start-up 1934.
PANEL SIZE: Pilot Rock—up to 4x16-ft.; Specialty treating; tempering, packaging for shipment.
THICKNESSES: 1/10 to ¼-in.
RAW MATERIALS: Pilot Rock—chipped sawmill leftovers, acid, size; Greenville—hardwoods
TRADE NAMES: Duron

UNITED WOOD CORP., West Memphis, Ark.
FLAKEBOARD
* PRODUCTION: 48,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. Daniel N. Copp; Plant Engr. Kenneth E. Scoggins; Vice Pres. Richard O. Wilson; Sec. Treas. Robert K. Jones
PROCESS: Homogeneous Batch-type
DATE OF PLANT START-UP: May, 1957 (est.)
PANEL SIZE: 16-ft. x 60-in.
PERCENT INTO CUT-UP SIZES: 75% (est.)
THICKNESSES: ½ to 1¼-in.
RAW MATERIALS: Soft hardwoods
SPEC. GRAVITY: 0.5 to 0.8
COLOR: Natural
USES: Furniture core, building
CHARACTERISTICS: Strength, dimensional stability and light weight

THE UPSON CO., Lockport, N. Y.
LAMINATED WOOD FIBER PANEL
PRODUCTION: Not specified
PERSONNEL: Pres. J. J. Upson; Vice Pres. Mfg. H. W. Schmidt; Tech. Dir. Dr. W. P. Ericks; Plant Engr. A. P. Nutter; Controller, K. A. Boor
PROCESS: Continuous Lamination
DATE OF PLANT START-UP: 1912
PANEL SIZE: 4x8 - 14 ft., 8x12 - 20 ft.
PERCENT INTO CUT-UP SIZES: 10%
THICKNESSES: ⅛, ¼, ⅜-in.
RAW MATERIALS: Ground wood (spruce); waste paper; cehmicals
SPEC. GRAVITY: Not specified
COLOR: Cream
USES: Sheathing, siding, interior walls, industrial, display
CHARACTERISTICS: Semi-soft board between insulation boards and hardboards
BOARD SPECIALTY TREATING: Striating

VICO CORP., Eldred, Pa.
PARTICLEBOARD (captive plant)
PRODUCTION: 3 million sq. ft./yr. estimated (⅝-in. basis)
PROCESS: Extrusion, 49-in. wide, ⅝-in. thick

WABASH SCREEN DOOR CO., 2222 Elm St. S. E., Minneapolis, Minn.
PARTICLEBOARD
* PRODUCTION: 10,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. E. W. Donahue, Mgr. A. M. Struthers, Supt. Roy Knutson, Tech. Dir. L. A. Patronsky
PROCESS: Miller-Hofft
PANEL SIZE: 66x72-in.
PERCENT INTO CUT-UP SIZES: 50%
THICKNESSES: ¼ to ⅞-in.
RAW MATERIALS: Ponderosa pine
SPEC. GRAVITY: 0.65 to 0.70
TRADE NAMES: Wabash wood particleboard
USES: Cores, furniture and plastics, underlayment, panelling
BOARD SPECIALTY TREATING: Edge banding

WESTERN PANEL, INC., Box 343, Sweet Home, Ore.
HARDBOARD
PRODUCTION: Under construction
PERSONNEL: Pres. Wallace W. Wodtli; Supt. Russell L. Rose; Office Mgr. Andy Black
PROCESS: Chapman; medium density
DATE OF PLANT START-UP: Fall of 1957

WEYERHAEUSER TIMBER CO., North Bend, Ore.
PARTICLEBOARD
PRODUCTION: 11,500,000 sq. ft./ yr. rated capacity (¾-in. basis)
PERSONNEL: Mgr. A. O. Karlen
PROCESS: Engineered and built by Miller Hofft
DATE OF PLANT START-UP: 1955
PANEL SIZE: 20-opening, 4x8-ft. press
RAW MATERIALS: Douglas fir sawmill residue wood
USES: Cores for plastic laminates, furniture, doors; wall paneling

WEYERHAEUSER TIMBER CO., Box 651, Klamath Falls, Ore.
HARDBOARD
* PRODUCTION: 90,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. F. K. Weyerhaeuser, Gen. Mgr. C. H. Ingram, Plant Mgr. J. B. Bishop, Mgr. Spec. Prod. Div. R. D. Pauley, Hdbd Sls. Mgr. R. T. Miller, Gen. Supt. N. J. Briggs, Night Supt. M. E. Hemphill
PROCESS: Continuous, dry forming
DATE OF PLANT START-UP: 1954
PANEL SIZE: 4x16-ft.
THICKNESSES: 1/12, 1/10, ⅛, 3/16, ¼-in.
RAW MATERIALS: Coniferous chips, resin, sizing
TRADE NAMES: Weylite and Weytex
BOARD SPECIALTY TREATING: Perforating. Inaugurated tempering plant March '57.

WILLAMETTE FIBRE & CHIP BOARD, INC., Sweet Home, Ore. (P. O. Box 516)
PARTICLEBOARD
* PRODUCTION: 27,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. Gen. Mgr. Hobart O. McQueary, Supt. L. W. Kemper
PROCESS: Own—dry
PANEL SIZE: 4x8-ft.
THICKNESSES: ⅜ - ⅞-in.
RAW MATERIALS: D. fir shavings, resins, sizing
DATE OF PLANT START-UP: 1955
SPEC. GRAVITY: 0.60 to 0.70
COLOR: Medium D. fir
TRADE NAMES: "Rezwood"
USES: Building construction (75%), interior and exterior, floors, ceiling, sheathing; furniture (25%).
CHARACTERISTICS: Machinability, acoustical properties, moisture resistant, lack of warping tendencies

WISCONSIN WOOD PRODUCTS, INC., Phillips, Wis.
HARDBOARD
* PRODUCTION: 37,500,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. and Mgr. Harry Gustafson
PROCESS: Semi-dry
DATE OF PLANT START-UP: June 1958
PANEL SIZE: 4x8-ft.
THICKNESSES: ⅛ to 5/16-in.
RAW MATERIALS: Pulpwood
SPEC. GRAVITY: 1.04
COLOR: Blonde

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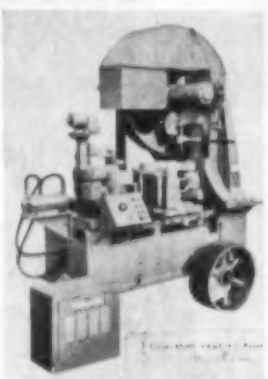

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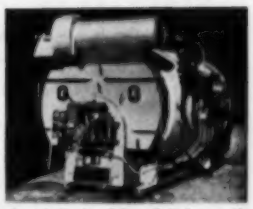

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WOODCORE, INC., Box 45, Scottdale, Pa.
PARTICLEBOARD
PERSONNEL: Pres. Irving L. Halsted
PROCESS: Chipcraft—vertical extrusion
DATE OF PLANT START-UP: July, 1957
PANEL SIZE: 50-in. x 12-ft.
RAW MATERIALS: Oak
TRADE NAMES: Woodcore
USES: Core stock
BOARD SPECIALTY TREATING: Cored in thicker sizes

WYNNEWOOD PRODUCTS CO., 303 Tena St., Jacksonville, Texas
PARTICLEBOARD
* PRODUCTION: 60,000,000 sq. ft./yr. rated capacity
PERSONNEL: Pres. Angus G. Wynne, Jr., Mgr. K. N. Stordalen, Supt. Delbert Cummins, Tech. Dir. Roy Bridges
DATE OF PLANT START-UP: 1955
PANEL SIZE: 48x96-in.
PERCENT INTO CUT-UP SIZES: 20%
THICKNESSES: ¼ to 1¼-in.
RAW MATERIALS: Southern Pine
SPEC. GRAVITY: 40-50-60 lbs. per cu. ft.
COLOR: Light
TRADE NAMES: Corstoc, Arcatex and Wynnewood No. 601
USES: Furniture manufacturing and construction
CHARACTERISTICS: Homogeneous cross sectional structural with firm edges and uniform physical properties

• The term "softwoods" is misleading.

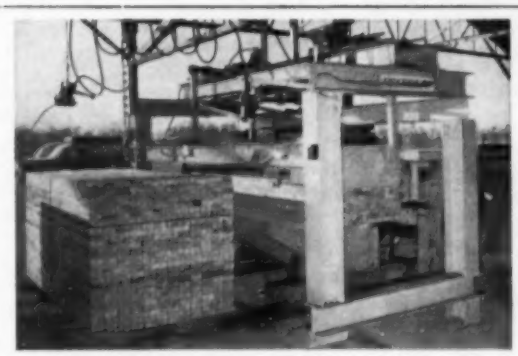
Actually softwoods are lumber species most generally used for structural purposes because of their strength and availability. Southern Pine lumber, generally recognized as the hardest of softwoods, is used for floors, siding, paneling, as well as structural elements of the residence. This hardness is what makes it wear well under conditions to which exterior and interior walls are exposed.

Jesse Tallman Retires

• Jesse J. Tallman, Union Lumber Co., Fort Bragg, Calif., retired from his post at superintendent of maintenance and construction in March.

Associated with the Union Lumber Co. since 1911, Tallman was appointed Superintendent of Maintenance and Construction for U. L. Co. in 1943. Among his many accomplishments, Tallman helped in the development of the Percy electric dog, and was responsible for the development of the tilting lumber hoist, the re-loader lumber hoist, and air tongs for cranes.

Jesse and his wife planned a trip to the Hawaiian Islands in April to visit their son, Jesse J. Tallman, Jr.



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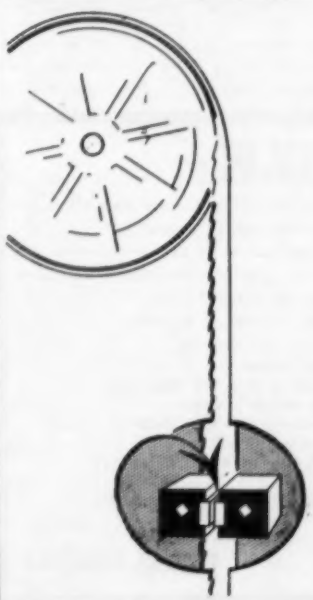

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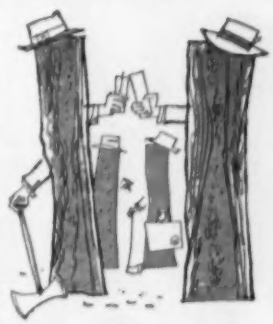
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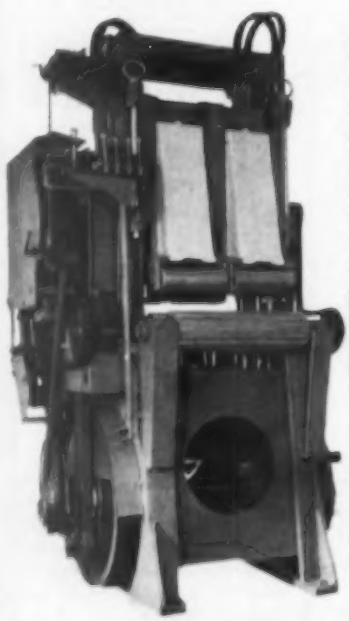

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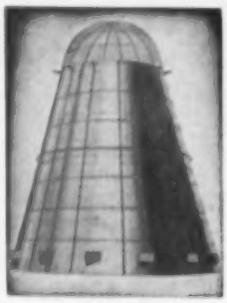

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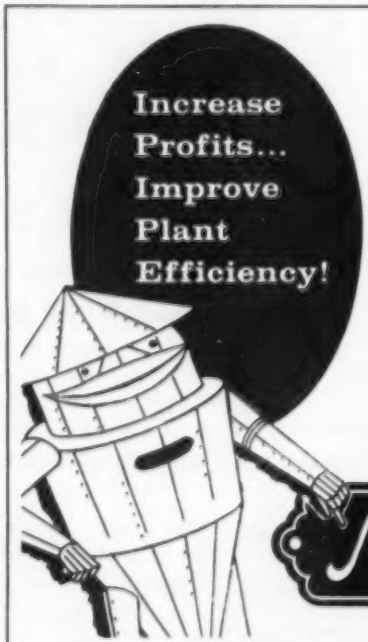

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Used 490 Fay & Egan Surfacer
Used Hermance 5 x 25 Surfacer
Used No. 969 Fay & Egan Shop type planer-matcher-surfacer—like new.
Used Bamford Premier 4" Electric moulder
Used No. C88 Yates-American Moulder
Used 8" x 36" Whitney single surfacer

RESAWS & RIP SAWS

Used 54" Marshon, anti-friction brg. tilt rolls
Used 54" Berlin resaw, screw set
Used 36" No. 2 Fayo & Egan BB circular resaw
Used 42" J. A. Fay & Egan band rip saw
Used 42" Cordesman band resaw
Used 40" No. 4 Band scroll resaw
Used 4 M-6 Yates 72" horizontal band resaw
Used No. V-6 Yates 72" heavy duty band resaw
Used 84" Marshon resaw, sawmill type, quick set
American No. 2 self-feed circular rip saw
Used No. 0 American rip saw
American Circular Resaw

NEW AND USED PUMPS

New 6 x 4 x 6 Worthington Duplex boiler feed
Used Worthington 4" Centrifugal—1000 GPM
Underwriter approved Firepumps—many sizes
Boiler water feed pumps—New & Used
Used 5" x 6" Fairbanks Centrifugal pump—500 GPM
Used 12" x 12" Westinghouse Centrifugal pump — 3000 GPM
Used 8" Jeansville 2 stage Centrifugal pump—2000 GPM

COMPRESSORS

33 cu. ft. New Worthington air cooled
43 cu. ft New Worthington air cooled
65 cu. ft. New Worthington air cooled
122 cu. ft. Used Worthington air cooled
194 cu. ft. New Worthington air cooled
198 cu. ft. Used Sullivan air cooled
311 cu. ft. Used Ingersoll Rand water cooled
324 cu. ft. Used Ingersoll Rand water cooled
465 cu. ft. New Worthington water cooled
500 cu. ft. Used Worthington water cooled
500 cu. ft Used Ingersoll Rand water cooled
750 cu. ft. Used Chicago pneumatic water cooled

HOISTS AND CRANES

Used single drum 6" x 15" spool
Used 5 ton House Erated single drum hoist—like new
Used American dbl. drum 24 x 24, 40 HP
New Budgit hoists in stocks
2 ton and 5 ton hand winches in stock

SHOP TOOLS

Used Oster pipe & bolt threader
Radial drill
American radial drill
8 x 16 Racine hydraulic hack saw
Kempsmith geared Maximatter
10 x 36 quick change lathe

MISCELLANEOUS

Used Stetson Ross 54" swing saw—BB
Used House-Erated 6 HP motorized saw arbor
American Columbia 48" oscillating 3 drum sander
Used Irvington 60" arm swing saw
Berlin 30" 3 drum sander
Used Morgan Box board matcher
Marson Johnson 20' precision trim & grinder
36" Crescent ball bearing band saw
Used Yates 36"—3 drum sander

FEED WORKS

New Gardner Hydraulic Shotgun Feed—on order
Used Wheland 5" belt feed
Used 5 x 6 SpeeDee Twin feed
Used 16 x 18 Allis steam twin feed, self-contained
Used 3" hydraulic shotgun

LOG AND CANT GANGS

Used 28" Wehrhahn Log Gang, complete, many extras
Used 34" Mill Engineering log gang, air carriage
Marathon No. 200 gang saw, 13 x 20, for cants
Marathon No. 120 gang saw, for logs or cants
Linck gang saw for logs or cants, 22 x 22—in stock
Linck gang saw for logs or cants, 28 x 28—in stock
Marathon No. 300—28" x 28" gang saw
Marathon No. 400—14" x 28" gang saw

FILING ROOM EQUIPMENT

New Armstrong No. 4 Stretcher Roll
New Armstrong No. 4 Band Saw Grinder
New Armstrong No. 54 Circular Saw Gummer
Used Armstrong No. 6 Band Saw Grinder
Used Armstrong No. 16 Circular Saw Grinder
New Marathon Gang Saw Grinder
Used Covel No. 140 automatic Band Saw Grinder
Used Covel No. 83 24" Gang Saw Grinder
Used Covel No. 217 RH Band Saw Grinder
Used Covel No. 90 LH Band Saw Grinder
Used Covel No. 150 RH Band Saw Grinder
Used Covel No. 109 Stretcher Roll 16" capacity
Used Hanchett No. 250 LH Band Saw Grinder
Used Hanchett No. 948 Circular Saw Grinder
Used Hanchett No. 724 36" auto. circular Saw Grinder
Used 12" Welding Clamp
New & Used Levelling Blocks

KNIFE GRINDERS

Used 36" Fay & Egan No. 253 automatic knife grinder
Used American 30" knife grinder
Used American 32" straight wheel knife grinder
New Dependable No. 99A5 36" motor drive, automatic knife grinder
New Dependable No. 101A sidehead grinder
New Defiance 30" motorized automatic knife grinder
Used Dependable 101A side head grinder
Used Berlin 275—36" Automatic knife grinder
Used Dependable 36" knife grinder, cup wheel
Used Hanchett 36" knife grinder, cup wheel

MILL EQUIPMENT

Used BeGo Hydraulic log turner
Used Corolth 1 man, 2 saw trimmer, 8' to 20'
New Wheland 1 man 2 saw trimmer, electronically controlled
Used 2-arm Log Stop & Loader, 36" arm, 12 x 16 opl.
Used 3-arm Log Stop & Loader, 42" arm, 16 x 20 opl.
Used 20' Portland Iron Log Turner
4—Used Garlinger Carriers 42"
New Willamette Iron Sawmill, Swede
Steel Deck with flippers
Used 10" x 12" full oscillating Nigger
Used 6" x 8" full oscillating Nigger for air
Used 40" x 40" Sawmill Burner—Bolted Sections

HEAD RIGS AND CARRIAGES

Used 6' Union Iron Works band mill
Used 54" Allis Chalmers Band Headrig—anti-friction
6' Yates band mill, all cast, LH
Used 8' McDonough bandmill
Used Monarch 3-block carriage, Andrus set
Used 16', 3-block 56" opening steel carriage
Used 18' Monarch 3-block 54" opening steel carriage
Used 14' International 3-block 52" opening steel carriage
Used 18' fabricated 3-block 60" opening steel carriage
Used 8' fabricated 3-block 32" opening steel carriage

LARGE MOTORS

Used 300 HP, 1200 RPM SB Fairbanks Morse
Used 300 HP, 600 RPM GE Slip Ring & Control
Used 250 HP, 600 RPM, West. Slip Ring & Control
Used 200 HP, 1200 RPM SB General Electric
Used 200 HP, 720 RPM SB General Electric
Used 150 HP, 720 RPM SB General Electric
Used 150 HP, 720 RPM SB Westinghouse
New 150 HP, 1200 RPM BB Allis-Chalmers
Used 100 HP, 1800 RPM BB Westinghouse
New 100 HP, 1200 RPM BB Allis-Chalmers
Used 100 HP, 1200 RPM SB Allis-Chalmers
Used 100 HP, 900 RPM SB General Electric
Used 100 HP, 900 RPM SB Fairbanks Morse
Used 100 HP, 720 RPM SB General Electric
Used 75 HP, 1800 RPM SB General Electric
Used 75 HP, 1200 RPM SB Allis-Chalmers
Used 75 HP, 1200 RPM SB Allis-Chalmers
Used 75 HP, 1200 RPM SB General Electric
Used 75 HP, 720 RPM SB Allis-Chalmers
Used 75 HP, 720 RPM, SB General Electric
PLUS MANY, MANY MORE

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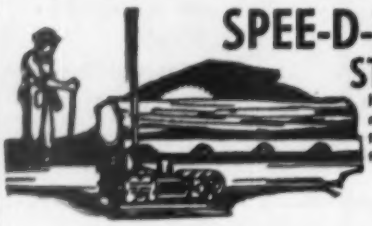

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BAND MILLS

2 Marinette 9' belt driven band mills, right and left hand.
1 Allis-Chalmers 10' right hand band mill, type C, roller bearings, 400-hp motor.
1 All-steel circular saw husk, top and bottom saws, ball bearings.

RESAWS

1 Yates H-5 horizontal band resaw, 64" wheels, ball bearings, endless table feed.
1 Diamond 60" horizontal band resaw lag bed feed
1 American 48" vertical band resaw, anti-friction bearings, 40-hp, 3-phase, 440-volt motor, V-belt drive, 3 saws
1 McDonough 72" vertical band resaw, anti-friction bearings, roll feed.
1 Fay & Egan 42" vertical band, model 180, V-belt drive, line bar feed

PLANERS — MOULDERS — SURFACERS

1 Berlin #16 16"x24" timber sizer, belt driven, 75-hp motor, blower, pipe, cyclone.
1 Champion 6"x24" planer, belt driven, 4 knife square heads.
1 Woods 4"x9" belted sticker.
1 Berlin No. 183 double surfacer, 4 knife round heads, 30"x8" capacity, belt drive

SPECIAL

Woods No. 415M, 6" x 15" motorized planer with feed tables, profiles.
Woods No. 404DM, 6" x 15" motorized planer with feed table.
Yates No. A66, 6" x 15" motorized planer with feed table.

SPECIAL

Diesel Generator set, Cummins diesel engine direct connected to GE, 250 KW, 440 volt, 3 phase generator, switchboard. Excellent condition.

LIFT TRUCKS

1 Gerlinger lift truck, model PH862, 16,000 lb. capacity, power steering, 10:00x20 tires.
1 Ross lift truck, model 15HT, 15,000 lbs. capacity, power steering, 9:00x20 tires.
2 Gerlinger lift trucks, model PH662-130, 6-ton capacity, power steering, V-8 engine, 10:00x15 tires.
3 Clark lift trucks, 6000 lb. capacity, solid tires, 6 cylinder gasoline engine.
2 Hyster model RT150, power steer, 15,000 lb. capacity.
1 Towmotor lift truck, solid tires, 6000 lb. capacity.

EDGERS

1 Prineville 6"x48" table type, ball bearings, double infeed and outfeed rolls.
1 New Prineville 4"x48", table type, ball bearings, double infeed and outfeed rolls.
1 All steel 4"x34" stub, anti-friction bearings, 5 14" saws.
1 Sumner 10"x72" stub, anti-friction bearings, divided press rolls.
1 New Parsons 6"x42" stub, ball bearings, all steel, double infeed rolls.
1 Corley 4"x42" Table Edger.

LUMBER CARRIERS

1 Gerlinger model SMH, swinging shoes, 42"x48" size, rebuilt.
5 Ross model 90, swinging shoes, 54"x58" size, late models.
1 Ross model 90, swinging shoes, 42"x58" size.
1 Ross model 91, swinging shoes, 54"x58" size, late model.
1 Hyster model MH, swinging shoes, 54"x 66" size, heavy duty.

CRANES & HOISTS

10 Garwood single drum winches, 30,000 lb. capacity, complete with line, new.
1 Puget Sound 2-drum loader mounted on 12-wheel all steel trailer, 36' boom.
1 Puget Sound wide drum yarder with Buda diesel and hydraulic torque converter.
1 Puget Sound 3-drum hoist with Waukesha engine, Brown-Lipe transmission.
1 Washington wide-drum steam yarder, 11x14, with 66" single firebox boiler.
1 American 7½x9 single-drum steam hoist.
1 Moore 7½x12 single drum hoist.

COMPRESSORS

1 Ingersoll-Rand portable air compressor, 60 cfm, 4 cyl. Waukesha engine.
2 Ingersoll-Rand V-type 3-stage compressors, gasoline engine driven.
1 Brunner single stage, 2-cylinder compressor, air cooled, V-belt drive.
1 Ingersoll-Rand horizontal, water-cooled steam-driven compressor, 14x12x12.
1 Chicago-Pneumatic, horizontal, water cooled, stationary, 10" bore, 10" stroke.
1 Blaisdell, horizontal, water cooled, stationary, 8" bore, 6" stroke.
1 Laidlaw-Dunn-Gordon 12x12, horizontal stationary.
1 Ingersoll-Rand portable air, 360 cu. ft., gasoline engine.
1 Gardner-Denver portable air, V-type, 2 pneumatic tires, Buda engine.

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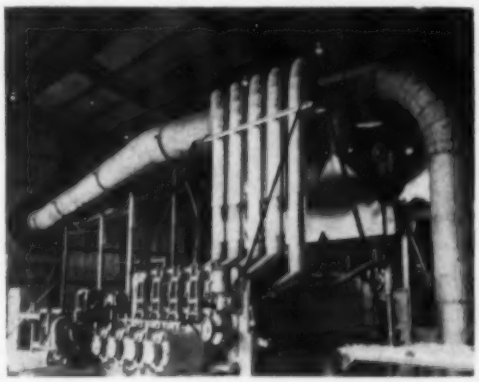

"Archer exhaust system for sander . . Archer vent system for hot press in background.

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1—#545 Greenlee 21' double end tenoner, electric, late

1—49" Yates 8-drum sander

1—50 x 98" high frequency extra heavy duty edger gluer

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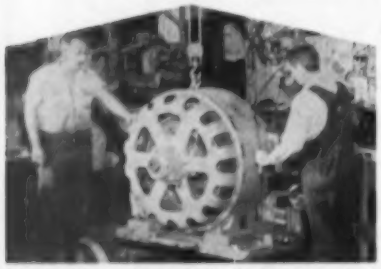

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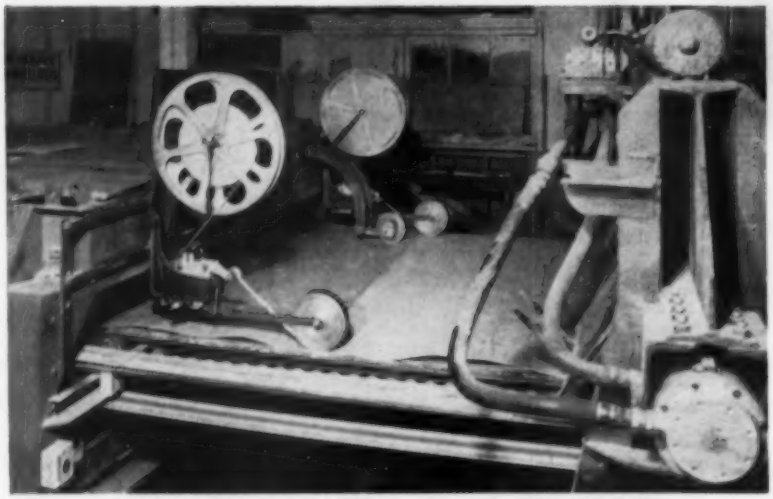
First Reports On

New Equipment

Remote-controlled Trout Setworks Now Available

• Klamath Machine & Locomotive Works has developed a completely remote-controlled trout setworks employing air cylinders, solenoid valves, and limit switches. These devices are already in constant use in the sawmill and are easily understood today by any competent mill wright or mill operator. Electrical circuits are all 110 V and can easily be carried by the standard pantograph. All electrical controls are floor mounted.

The finished product still employs the standard trout automatic set-up ring and set-up guide blocks, holding pawl, setting arm and ratchet wheel, and sets can be made in either direction. This setwork will do anything that can be done with a setter-operated setworks and in the same amount of time or less. As it is automatic, it has the added advantage of consistent, cushioned operation, resulting in attaining the full accuracy plus less wear and tear on parts.



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A STRIP OF ONE-INCH TAPE is automatically applied close to each edge of the veneer as it moves from the edgegluer to the clipper. This application is made by mounting two tape moistening units and reels of tape in a similar position, then threading the tape through the water moistening units and under the heavy brass rollers used to seal the tape to the veneer. From then on, the tape is continuously applied as the veneer moves to the clipper.

• ***General Electric Communication*** Products Department, Syracuse, N. Y., has published its first bulletin on its new "Channel Guard" tone squelch device, designed to reduce interference problems in two-way radio systems. The bulletin — ECR 449 — describes how unwanted signals and transmissions may be avoided if the new device is installed in new radio systems or those already in use in the field.

Yours For The Asking

SUPPLIERS TO FOREST industries are constantly coming up with new and interesting literature describing their products and services. This material is offered free to our readers. Just drop a card or letter to the supplier mentioned. There is no cost or obligation. — Ed.

• Catalog 907 illustrating and describing ***Jeffrey*** rigid hammer type shredders, grinders, hashers for reducing wood chunks and other materials has been released by the Crusher Division, Jeffrey Mfg. Co., Columbus 16, Ohio. This 16-page catalog includes installation photos, details of construction and operation, dimension drawings and general specifications.

• A new 2-color catalog illustrating and describing the complete line of ***Moline Malleable Chains*** is now available. Covers all available types of conveyor, elevator and power transmission chains including mill chain, elevator buckets, and several new chain developments. Shows method of installing chain and how to identify chain attachments. Moline Malleable Iron Co., St. Charles, Ill.

• ***Detroit Diesel Engine*** Div., General Motors, has issued a 20-page catalog outlining its complete line of power units for all types of industrial applications. This will be of special interest to operators of portable mills. Specifications are given on 31 engine models ranging from 44 to 761 brake horsepower including the Division's new six-cylinder Turbopower engine. Copy of the new catalog may be obtained by writing Detroit Diesel Engine Division, General Motors Corp., Detroit 28, Mich.

• Vickers Bulletin No. 57-68 shows recent improvements in design and additional mountings for their "Compact" hydraulic cylinders. It provides detailed information on construction and features of 2000-psi cylinders including the new trunnion-mounted cylinders, as well as complete tables on application. Write Vickers Inc., Detroit 32, Mich.

• Useful technical information on saw filing, including a glossary of saw shop terms; suggestions on how to operate a saw shop; care and safety precautions for equipment plus news of their filing equipment is available from ***Max Mfg.*** Co., 138 Stockton Ave., San Jose 26, Calif.

thanks a lot . . .

—for your patience and understanding during the recent merging of **THE LUMBERMAN** and **THE TIMBERMAN.** Many subscribers had difficulties with their subscriptions during the past few months while the Circulation Department in San Francisco was working feverishly to bring the subscription files of **THE LUMBERMAN** and **THE TIMBERMAN** together.

Almost 30,000 file cards of subscribers' names, addresses, expiration codes and business classification information had to be interfiled and compared.

Then the responses from all subscribers to our letters asking which they wanted to receive — **THE LUMBERMAN** or **THE TIMBERMAN** or both —had to be processed and checked against this massive file. After this, new addressing plates were prepared for all subscribers.

The work is just about done now and backlogged subscription orders, renewals, inquiries, and adjustments are rapidly being "cleaned up."

If you had trouble with us during this trying period, we hope you will accept our apologies—and our assurances that in the future you can expect prompt service. And if we can be of any service to you, please write directly to me.

CHARLES C. BAAKE,
Circulation Manager

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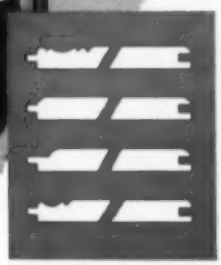

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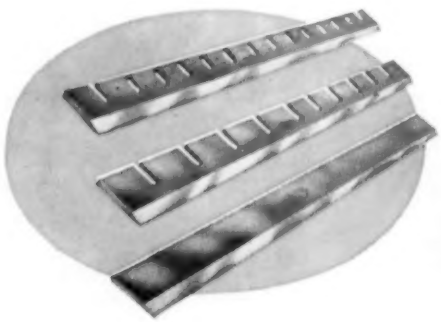

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